FINAL REPORT

June 1984

PHASE 1
Wildlife Impact Assessment and Summary
of Previous Mitigation Related to Hydroelectric
Projects in Montana

VOLUME TWO(b) - CLARK FORK RIVER PROJECTS: CABINET GORGE AND
NOXON RAPIDS DAMS
OPERATOR: WASHINGTON WATER POWER COMPANY

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PREFACE

This assessment addresses the impacts to the wildlife populations and wildlife habitat, and previous mitigation of these impacts due to hydroelectric projects on the lower Clark Fork River. This document represents the first half (Phase 1) of the project, while Phase 2 will include alternative mitigation measures based on the impact assessments of Phase 1. Three hydroelectric projects are located on the lower Clark Fork River; however, because two private utility companies were involved, separate documents addressing the impacts due to the project operated by the two utilities were developed. In order to develop and guide mitigation efforts, it was first necessary to estimate wildlife and wildlife habitat impacts attributable to the construction and operation of the projects. The purpose of this report was to document best available information concerning the wildlife species impacted and the degree of the impact. A target species list was developed to focus the impact assessment and to direct mitigation efforts. Many non-target species also incurred impacts but are not discussed in this report. All wildlife habitats inundated by the two reservoirs are represented by the target species. It was assumed the numerous non-target species also affected will be benefited by the mitigation measures adopted for the target species.

Impacts addressed in this report were limited to those impacts directly attributable to the loss of habitat and displacement of wildlife populations due to the construction and operation of the two hydroelectric projects. Secondary impacts, such as the relocation of railroads and highways, and the increase of the human population, were not considered. In some cases, both positive and negative impacts were assessed; and the overall net effect was reported. The loss/gain estimates reported represent impacts considered to have occurred during one point in time except where otherwise noted. When possible, quantitative estimates were developed based on historical information from the area or on data from similar areas. Qualitative loss estimates of low, moderate, or high with supporting rationale were assessed for each species or species group. These qualitative estimates will provide a basis for determining the relative level of mitigation efforts as agreed to by the participating agencies. Quantitative loss estimates will provide additional support for the level of mitigation necessary and will aid in evaluating success.

It should be noted that for some species, data were not available for impact analysis. In these cases, it was necessary to use best professional judgment based on the opinion of several knowledgeable biologists.

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I. INTRODUCTION

The Noxon Rapids and Cabinet Gorge dams are run-of-the-river hydroelectric projects located on the lower 58 miles of the Clark Fork River upstream from Lake Pend Oreille (Figure 1). The two projects collectively inundated nearly 17 square miles of wildlife habitat including aquatic, riparian, and terrestrial habitats. Loss of riparian habitat was especially critical to wildlife populations, as these areas often support the highest productivity, species diversity, and species densities (Carothers 1977, Thomas et al. 1980). Since vacant replacement habitat in the vicinity of the projects probably did not exist, inundation of the various habitats by the the two hydroelectric projects resulted in almost entirely negative impacts to the diverse wildlife populations inhabiting the area.

A. INITIAL WILDLIFE CONCERNS

Construction of the Cabinet Gorge project occurred during a time when little concern was expressed for wildlife losses due to the development of hydroelectric projects. Understanding of the relationship between wildlife and habitat was in its infancy, and few wildlife management techniques were developed. State Fish and Game biologists were few in number and responsible for large areas. Little site specific information was known about many of the wildlife populations within the area of concern. In a letter to the Federal Power Commission, the Fish and Wildlife Service reported the project would have little effect on wildlife (U.S. Dep. Inter. 1966); however, the negative impacts to the fisheries resource were recognized (Jeppson 1953, U.S. Dep. Inter. 1966).

During the application process for the construction of the Noxon Rapids dam, some wildlife concerns were expressed. Stefanich (1953), in a letter to the superintendent of state fisheries, reported, "some excellent deer areas will also be flooded, but to what extent is not known at the present time". The state Fish and Game warden estimated a 10 percent reduction of big game winter range with considerably greater impacts occurring during severe winters (O'Claire 1955). The U.S. Forest Service (U. S. Dep. Agric. 1957) estimated a loss of approximately 8,000 acres of white-tailed deer winter range due to the Cabinet Gorge and Noxon Rapids reservoirs.

The Fish and Wildlife Coordination Act, designed to minimize or mitigate the effect of large water resource development projects on the fish and wildlife resources, was ineffective until a 1958 amendment strengthened the Act (U.S. Dep. Inter. 1980). In accordance with the Act, the Bureau of Sport Fisheries and Wildlife prepared a document reviewing the fish and wildlife resources in relation to proposed federal water development projects in the Clark Fork River basin. In the report the following impacts to the

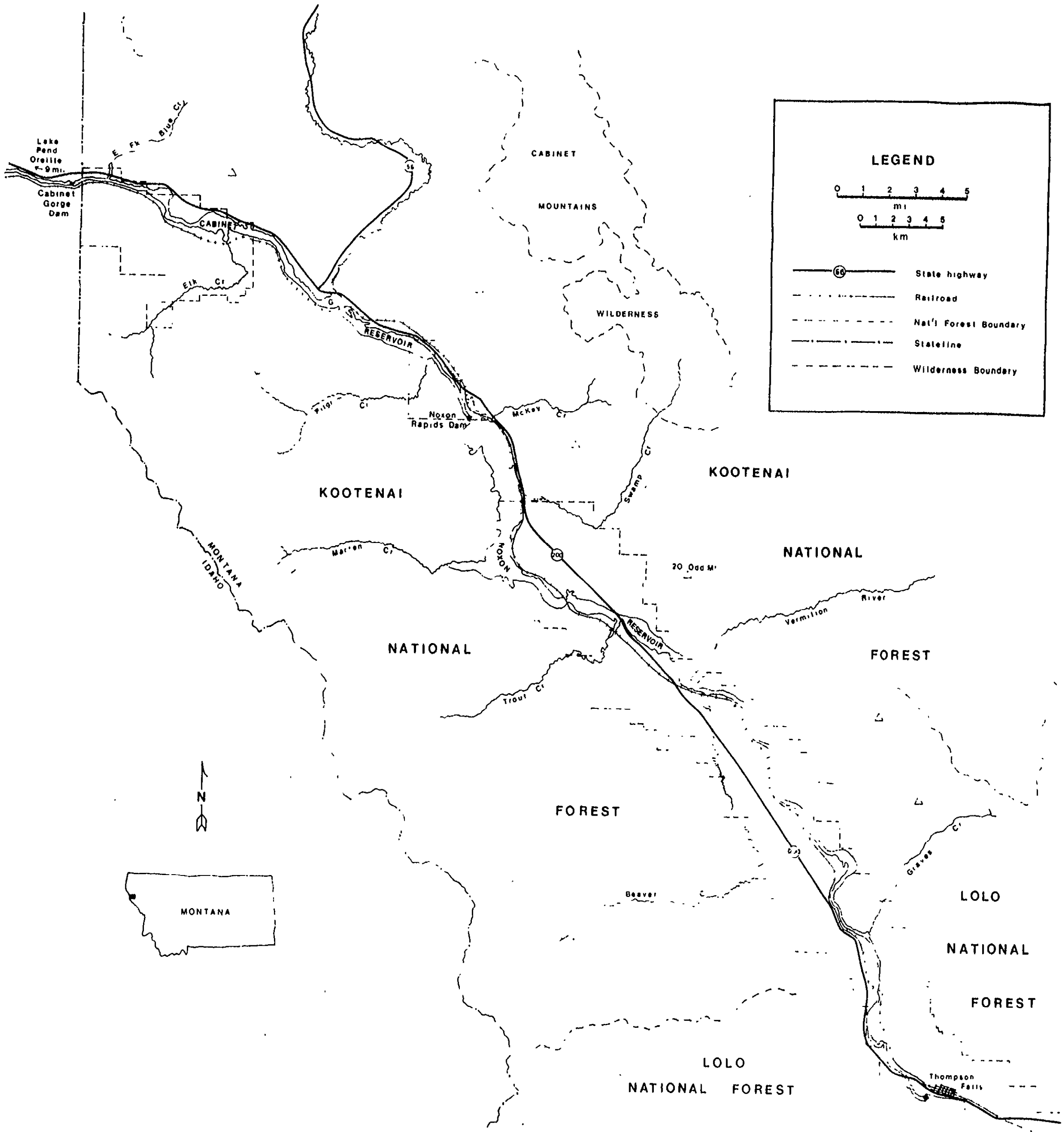

Figure 1. Cabinet Gorge and Noxon Rapids hydroelectric projects found on the lower Clark Fork River, Sanders County, Montana.

wildlife resource due to hydroelectric projects located on the mainstem and tributaries of the lower Clark Fork River between Paradise and the Montana-Idaho border, were recognized (U.S. Dep. Inter. 1959:91):

> "...essential big-game habitat would be decreased with the project construction. Replacement of flooded range areas would be difficult. Impoundment of water would effect deer crossings. Reservoir ice conditions would be hazardous to the animals. Impoundment would destroy present upland bird habitat and adversely affect grouse numbers. Beaver and muskrat populations in the impoundment area would be virtually eliminated. Minks, however, may be expected to utilize reservoir shore zones. Failure to provide adequate sustained flows downstream from the dam would adversely affect downstream fur-animal populations and habitat.
>
> "Waterfowl utilize the river area proposed for development. River islands are used by nesting waterfowl, especially Canada geese. Increased use of the reservoir area by waterfowl is not expected. Impoundment fluctuations would tend to discourage establishment of desirable aquatic vegetation. Islands would be inundated and an attempt should be made to replace this lost habitat."

This document was endorsed by the Montana Department of Fish and Game in a letter appended to the Bureau of Sport Fisheries and Wildlife report (U.S. Dep. Inter. 1959).

B. HYDROELECTRIC PROJECT - DESCRIPTION AND OPERATION

Cabinet Gorge Dam is located approximately 9 miles from Lake Pend Oreille. The dam is located just inside the Idaho border while the reservoir is almost entirely within Montana. Construction began in February 1951, and filling of the reservoir began in August 1952. The concrete dam is 375 feet long and 140 feet high. The 3,200 acre reservoir (full pool) extends upstream to the Noxon Rapids project, a distance of 20 miles. Daily and weekly fluctuations are approximately 2 and 3 feet, respectively. Maximum possible drawdown is 15 feet and generally occurs only during maintenance, every 1-2 years. Cabinet Gorge Dam is presently operated in close coordination with Noxon Rapids Dam and serves as a reregulating reservoir.

Noxon Rapids Dam is located 20 miles upstream from the Cabinet Gorge Dam and was completed in 1959. The dam is 4,910 feet long and 180 feet high. The 38 mile long reservoir has a surface area of 7,900 acres at maximum pool elevation. The Noxon Rapids Dam is operated as a peaking plant within the confines of river flows. Maximum allowable daily and weekly drawdown is 2 and 10 feet, respectively. Seasonal drawdown of 36 feet may occur from late winter until spring runoff begins, as required under the terms of the Northwest Power Coordination Agreement.

C. AREA OF CONCERN

The lower Clark Fork River flows in a northwestern direction to Lake Pend Oreille, Idaho. The topography was greatly influenced by the massive glacial Lake Missoula (Tilton 1977) as evidenced by the typically narrow, U-shaped river valley. The valley floor at 2,400 feet is bounded by steep mountains rising to over 5,900 feet. The Cabinet Mountains border on the north and the Coeur d'Alene Mountains lie to the south of the river. Chief tributaries are the Thompson, Vermilion and Bull rivers.

The floristic composition reflects the mild Pacific maritime climate influence. Redcedar (Thuja plicata) and hemlock (Tsuga heterophylla) dominate the western, more moist section of the lower Clark Fork River area, as well as the stream bottoms. Dense forests of Douglas-fir (Pseudotsuga menziesii), lodgepole pine (Pinus contorta), western larch (Larix occidentalis), and ponderosa pine (Pinus ponderosa) occupy the benches and slopes above the river. Broadleaf trees and shrubs are found as narrow strips along the river and stream bottoms. A mosaic of conifers and hardwoods lie in between. Cultivated areas of small grains and hay are scattered throughout the valley floor.

Abundant and diverse wildlife populations inhabit the area. Big game species such as elk (Cervis elaphus), white-tailed deer (Odocoileus virginianus) and mule deer (O. hemionus) are common in the timbered mountains and bottomlands. Bald eagle (Haliaeetus leucocephalus) and osprey (Pandion haliaetus) are found along the waterways. Many other species of big game species, upland game birds, waterfowl, furbearers and raptors occupy the area.

The specific area of concern addressed within this report focuses on the habitats lost due to inundation by the two reservoirs. Adjacent federal and private lands were considered for those species which occupied large home ranges or seasonal ranges. Consideration of these adjacent areas was necessary to develop the impact assessments based on the drainage-wide perspective.

II. METHODS

A. LITERATURE REVIEW AND INTERVIEWS

An extensive review was conducted of the files maintained by the Montana Department of Fish, Wildlife and Parks (MDFWP) and the U.S. Forest Service, Lolo and Kootenai National Forests, in order to obtain all the records containing wildlife information pertinent to the lower Clark Fork River project area.

Persons knowledgeable of the area were interviewed. These contacts included current area biologists, retired MDFWP personnel, and long-time residents of the area. Notes of the interviews are on file.

B. HABITAT TYPING

Aerial photos (1:20,000) supplied by the Soil Conservation Service, taken prior to construction of the Noxon Rapids and Cabinet Gorge dams (1937 and 1945 series) were used to determine habitats within the pool areas of these reservoirs. Using current U.S.G.S. topographic maps (1:24,000), the reservoir boundaries were delineated onto the aerial photos. Generic habitat mapping units, recognizable in the aerial photos, were drawn on mylar overlays and total acres were determined by a digital planimeter. These generic habitat types were used to develop the impact assessments and will assist in the development of mitigation alternatives (Phase 2). The generic habitat mapping units were further described by ground-truthing similar habitats adjacent to the reservoirs in order to detail understory species composition.

C. DESCRIPTION OF HABITAT MAPPING UNITS

1) Aquatic/Wetlands

This habitat mapping unit (HMU) included all the open water areas, associated rivers, streams, ponds, sloughs, and marshes located within the project area of concern. All the emergent vegetation zones identified within or along the edges of the open water were included. When possible, the following subtypes were identified: a) rivers and streams, b) ponds, and c) sloughs and marshes.

2) Gravel Bars

These were unstable areas containing sparse vegetation associated with islands and streambanks. These areas were usually covered with water during periods of high flows which restricted the establishment of grasses and grass-like plants.

3) Grasslands-Hay Meadows

This HMU included those areas dominated by a variety of grasses, sedges (Carex spp.) and rushes (Juncus spp.) influenced by the presence of an elevated water table. Agricultural hay bottoms and grain fields were included within this type. A variety of trees and/or shrubs were sometimes present within this type; however, they composed less than an estimated 10 percent of the total canopy coverage.

4) Deciduous Tree-Shrub Riparian

This HMU, composed of the deciduous broadleaf species, was found adjacent to the river and tributaries, and was generally restricted to a narrow band except in broad floodplain areas. When present, the tree overstory contained primarily black cottonwood (Populus trichocarpa) or birch (Betula spp.). A dense shrub and herbaceous understory was usually present. Scattered conifers may be found within this type; however, the conifers comprised less than an estimated 20 percent of the total tree canopy.

5) Mixed Conifer-Deciduous Forest

This HMU generally occupied the floodplain between the riparian vegetation and the dense conifer forests and represented a complex mosaic of conifer tree species and deciduous tree/shrubs. The canopy was generally dominated by conifer species such as Douglas-fir, ponderosa pine, and lodgepole pine (Pinus contorta). Areas of greater precipitation supported redcedar, hemlock and spruce (Picea spp). Deciduous tree species such as cottonwood and birch and a variety of deciduous shrub species were found in this type. Generally, the deciduous species comprised at least 10 percent of the canopy cover.

6) Upland Shrub

This HMU included areas dominated by several species of shrubs, including serviceberry (Amelanchier alnifolia), Rocky Mountain maple (Acer glabrum), ceanothus (Ceanothus spp.) and snowberry (Symphoricarpos spp.). These areas represented a seral stage of plant succession related to old fires or logged areas. Tree canopy comprised less than an estimated 10 percent of the total canopy coverage for a given map unit.

7) Douglas-Fir/Larch/Ponderosa Pine Forest

This generalized type was used to describe coniferous forests found within the pool areas and consisted of a wide variety of forested habitats dominated by coniferous tree species. Due to the limited resolution of the aerial photos, specific forest habitat types (as utilized by the two National Forests) were not identified.

This type generally occupied drier sites than the Cedar-Hemlock forest habitat mapping unit and included the warm, dry open stands of Douglas-fir and ponderosa pine on south and west aspects, to the denser, cooler stands of Douglas-fir, western larch and lodgepole pine on north and east aspects. A variety of shrubs, grasses and forbs were found in the understory.

8) Cedar-Hemlock Forest

This HMU was associated with warm, moist sites and contained a mixture of conifers in the overstory. Grand fir (*Abies grandis*), western hemlock, and western redcedar were the primary species which formed the dense overstory canopy.

9) Developed Areas

These areas included towns, farm buildings, gravel pits and other disturbances associated with human development.

10) Cliff-Eroded Banks

These were areas supporting sparse vegetation found adjacent to the river and streams.

D. TARGET SPECIES LIST

A target species list was developed addressing the primary wildlife species impacted by the project and of primary concern to MDFWP. This list did not address the abundant nongame species utilizing the habitats associated with the area of concern. Loss of riparian areas, mountain shrublands and open conifer forests had a detrimental impact on the populations of small mammals, raptors and other avifauna which were yearlong or seasonal residents of the area. Mitigation efforts directed toward the target species are likely to benefit many of these species because of overlapping habitat requirements.

The following were considered in the designation of target species:

a) Those species determined to have incurred the greatest impacts as a result of the reservoirs;

b) Species previously targeted by the MDFWP as "species of special concern" (Flath 1981);

c) Species registered as threatened or endangered; and/or,

d) Species designated as priority species in the MDFWP regional plan (draft report, Montana Dep. Fish, Wildl. and Parks, Kalispell).

E. IMPACT ANALYSIS

An impact analysis was developed for each species or group of species identified on the target species list. The impact analyses were based on historical population and species distribution information and acres of habitat disturbance. All available data were used in the analysis, and where possible, both quantitative and qualitative loss estimates were developed. The quantitative loss estimates reflect actual densities of animals capable of having been supported by the inundated habitats. When species density estimates were not available, the loss estimates reflect the loss of specific required habitat. When possible, a range of estimates was determined in order to establish bounds for the loss estimates; thus, a minimum and maximum figure was identified. The actual loss or gain was assumed ') be within this range.

In some instances, adequate population or density information was unavailable and only qualitative loss estimates were developed. Qualitative loss estimates of high, moderate, or low were used to describe impacts by the two hydroelectric projects. The following were considered in the development of the qualitative loss estimates:

a) Numbers of animals impacted in relation to the overall population of the species in the area;

b) Seasonal or year-round importance of the habitat lost or enhanced for a particular species;

c) Loss or gain of sites important to the production and/or survival of offspring, especially to rare species;

d) Ability of the species to establish populations in adjacent areas and the availability of these suitable areas; and

e) Effect on social or territorial mechanisms regulating populations.

F. PREVIOUS MITIGATION

Previous mitigation efforts were determined by contacting operator biologists, local conservationists and sportsmen and reviewing MDFWP and other agency files. Current status of known wildlife mitigation projects, mitigating the impacts resulting from the construction of the hydroelectric projects, within the reservoirs is reported.

E. CREATION/ENHANCEMENT OF WILDLIFE HABITAT

Recent color aerial photos were compared to pre-project aerial photos and topographic maps to determine the extent of wildlife habitat created or enhanced by the reservoir. The presence of "new" islands, ponds, and riparian vegetation attributable to the formation of the reservoirs was documented. It may be argued "new" wildlife habitat was not created but, more correctly, a change in the type or quality of the habitat occurred. For instance, islands created during the formation of the reservoir already existed as wildlife habitat; however, the previous upland areas are now surrounded by water, not creating a new habitat but possibly enhancing the area for certain species (i.e. Canada geese). Additionally, the newly created islands do not directly replace the inundated islands, as the river islands generally supported complex plant communities of riparian vegetation and coniferous-deciduous tree species. Many of the islands created by the reservoirs are the uninundated tops of small hills generally supporting upland plant communities. Many of the ponds created by the reservoirs were formed by dikes used to relocate the railroad. These particular ponds support very little riparian vegetation and are not directly comparable to the natural beaver ponds and oxbows existing prior to construction of the reservoirs. Similarly, newly created marsh and slough areas probably existed as pre-project wetlands ; however, the raising of the ground water level increased the amount of open water in these areas and likely enhanced the amount of riparian vegetation.

III. TARGET SPECIES LIST

Numerous species of big game, furbearers, waterfowl, upland game birds, as well as the non-game species of small mammals, raptors and other birds were impacted by the loss of habitat. The primary purpose of the target species list is to focus the potential mitigation efforts toward those species which experienced the greatest impacts due to the hydroelectric projects, and those which will receive the greatest benefit for a given mitigation effort. As mitigation projects are developed, they will be designed to benefit one or more of the target species. In addition, the projects are expected to benefit many non-target species. The target species are:

1) White-tailed deer (Odocoileus virginianus)
2) Mule deer (O. hemionus)
3) Elk (Cervis elaphus)
4) Black bear (Ursus americanus)
5) Grizzly bear (Ursus arctos horribilus)
6) Mountain lion (Felis concolor)
7) Bobcat (Lynx rufus)
8) River otter (Lutra canadensis)
9) Beaver (Castor canadensis)
10) Ruffed grouse (Bonasa umbellus)
11) Bald eagle (Haliaeetus leucocephalus)
12) Osprey (Pandion haliaetus)
13) Canada goose (Branta canadensis)
14) Other waterfowl
    - Mallard (Anas platyrhynchos)
    - Common merganser (Mergus merganser)
    - Common goldeneye (Bucephala clangula)
    - Barrow's goldeneye (B. islandica)
    - Wood duck (Aix sponsa)

IV. RESULTS

A. HABITAT

Construction of the Cabinet Gorge and Noxon Rapids dams created two reservoirs with full pool surface acreages of 3,200 acres and 7,900 acres, respectively, inundating approximately 17 square miles of wildlife habitat. Table 1 summarizes the acreage estimates for the inundated generic habitat mapping units and acres of habitat determined to have been created or enhanced by the reservoirs. Net acreage estimates were calculated and were utilized in determining the impact assessments and loss estimates. Maps illustrating the distribution and extent of the inundated habitats are on file in the regional office, MDFWP, Kalispell, Montana. In addition, copies of these maps will be sent to all cooperating entities.

1) Cabinet Gorge Reservoir

Nearly 20 miles of the Clark Fork River plus the lower reaches of several tributaries, including Elk Creek, Bull River, and East Fork Blue Creek, were inundated by Cabinet Gorge Reservoir. Acres of river and streams inundated (500 acres) were assumed to be the amount of acres remaining when the terrestrial (plus sloughs-marshes) acreage (2,700 acres) was subtracted from the full pool acreage (3,200 acres). River and stream mileage estimates were more useful in the determination of loss estimates for certain wildlife species (i.e. beaver, river otter).

No ponds were determined to have been inundated by the reservoir; however, 9 ponds totaling 87 acres were created. Several of these ponds were created by railroad dikes within or adjacent to the reservoir. The steep, rocky banks, formed by the dikes, provide poor substrate for riparian vegetation. A few open water areas supporting emergent vegetation were created by the elevated water table. Approximately 20 acres of sloughs-marshes were inundated by the reservoir; however, 117 acres of sloughs-marshes were created or enhanced. These areas supported a variety of hydrophilic plant species including sedges, various grasses, cattails (*Typha spp.*), and a few deciduous shrubs. Prior to construction of the dam and subsequent filling of the reservoir, these areas were lowland wet meadows, dry oxbows, or intermittent stream drainages representing important wildlife habitat. However, because these areas currently support standing water and possibly a greater diversity of riparian plant species, it was agreed during coordination meetings to credit these areas as acres enhanced by the reservoir.

Approximately 2,680 acres of terrestrial habitat found on islands, floodplains, terraces, and upland areas were inundated. A total loss of terrestrial habitat was assumed as no acres of

Table 1. Habitats (acres) inundated following construction of two hydroelectric projects on the lower Clark Fork River.

	Cabinet Gorge			Noxon Rapids		
	Lost	Created/ Enhanced	Net	Lost	Created/ Enhanced	Net
AQUATIC/WETLANDS						
River-streams	500	---	- 500	1900	---	-1900
Ponds	---	87	+ 87	---	22	+ 22
Sloughs-marshes	20	117	+ 97	---	50	+ 50
TERRESTRIAL						
Cedar-hemlock	480	---	- 480	200	---	- 200
Douglas-fir-larch-ponderosa pine forest	---	---	---	2300	---	-2300
Mixed conifer-deciduous forest	1350	---	-1350	1300	---	-1300
Deciduous tree-shrub	330	---	- 330	410	---	- 410
Grassland-hay meadows	320	---	- 320	1100	---	-1100
Upland shrub	---	---	---	530	---	- 530
Gravel bars	170	---	- 170	160	---	- 160
Cliffs-eroded banks	30	---	- 30	---	---	---
TOTAL	3200	240	-2996	7900	72	-7828

terrestrial habitat were created or enhanced. The mixed conifer-deciduous forest found adjacent to the river and on nearby terraces, comprised the largest acreage loss (1,350 acres). Dense cedar-hemlock forests (480 acres) occupied upland areas and the steep river banks. The amount of deciduous tree-shrub riparian (330 acres) may be underestimated due to the poor resolution of the aerial photos and concealment by a dense conifer overstory.

Within the river, approximately 170 acres of gravel bars and nine islands, totaling 270 acres, were inundated. The number of islands represents the minimum number lost as numerous gravel bars, seasonally isolated from the mainland were not included in the total. Plant communities found on the islands were included in the appropriate generic habitat mapping unit. Two islands, totaling 8 acres, were created by the reservoir.

2) Noxon Rapids Reservoir

The Noxon Rapids project, largest of the two reservoirs, inundated approximately 6,000 acres of terrestrial wildlife habitat (Table 1). Thirty-eight miles of the Clark Fork River and the lower reaches of several major tributaries, including Marten Creek, Vermilion River, Trout Creek, Beaver Creek, and Swamp Creek, were inundated. The difference between the inundated terrestrial wildlife habitat (6,000 acres) and the reservoir area at full pool (7,900 acres) was assumed to be the acres of rivers and streams inundated (1,900 acres).

No ponds were determined to have been inundated by the reservoir; however, 2 ponds totaling 22 acres were created. One pond was formed by a railroad dike and supported little riparian vegetation. A second pond was created adjacent to the reservoir as a result of the elevated water table. By comparing current (1982) aerial photos to photos taken before construction (1937 and 1945), it was determined no marsh or slough areas were inundated. Approximately 50 acres of habitat were enhanced by the increased amount of riparian vegetation attributable to the Noxon Rapids Reservoir. These areas included slough-marsh areas found adjacent to the reservoir.

The Douglas-fir/larch/ponderosa pine forest comprised the largest amount of acres inundated (2,300 acres). Mixed conifer-deciduous forest (1,300 acres) and grassland-hay meadows (1,100 acres) also comprised a major portion of the inundated terrestrial habitats, and reflected the drier climate and more extensive agricultural development found in the area inundated by the Noxon Rapids Reservoir.

Within the river, approximately 160 acres of gravel bars and three islands, totaling 27 acres, were inundated. Plant communities found on the islands were included in the appropriate generic habitat mapping unit. Twelve islands, totaling 30 acres, were created by the reservoir.

B. WHITE-TAILED DEER

1) Introduction

Historical records documented the presence of deer in the lower Clark Fork River valley as early as 1809 when David Thompson established the Salish House, a trading post, near Thompson Falls. Deer were apparently relatively common, as records indicated Thompson and his crew survived on 145 deer during the first winter. No species distinction was made but the deer were described as generally small and of slight stature (White 1950). Ross Cox of the Northwest Fur Company survived on deer killed along the Clark Fork River near Thompson Falls during the winter of 1812 (Koch 1941). In the 1840's, W. A. Ferris during one winter killed 46 deer (Ferris 1873). Towar^d the end of the century, deer were still common as indicated in a letter dated January 19, 1890 written by D. V. Herriott, an early Thompson Falls resident: "There is an abundance of all kinds of game here. Deer, prairie chickens, grouse, ducks, mountain sheep, mountain goats, elk and in fact every kind of game in abundance" (Dufresne 1976).

In 1910, approximately 60 percent of the Cabinet National Forest, which surrounds the lower Clark Fork River, was burned by a forest fire. The riparian vegetation likely remained (J. Peek 1983, pers. commun.) and became even more important to the white-tailed deer as islands of habitat.

With the establishment of the Cabinet National Forest in the early 1900's came the first detailed records of game species. Although just estimates, these early records provide useful perspectives on population trends. The Forest Service attempted to estimate deer populations as early as 1919. White-tailed deer were not classified separately until the mid 1930's when reports suggested dramatic increases in their numbers. By the late 1950's, white-tailed deer populations were believed to be at record highs.

2) Seasonal Habitat Preference

Various studies have described the distribution and habitat use of white-tailed deer in northwestern Montana. In the Swan River Valley, researchers identified important summer range as mesic sites in association with a diversity of habitat types including dense coniferous forests (Mackie et al. 1980). Winter range, in the same area, was described by Mundinger (1982) as riparian habitat with variable use of timbered upland habitat. River bottomlands were identified as primary winter range for white-tailed deer in the Fisher River and Kootenai River drainages (Blair 1955). Mixed riparian hardwoods and open ponderosa pine stands found on south and west slopes were two general forest types identified on these winter ranges. During average winter conditions, deer were distributed throughout the two types, while during severe winter conditions, deer were restricted to the riparian lands and lower benches (Zajanc 1948, Blair 1955). These regional studies emphasize the importance of the riparian areas, particularly during winters.

White-tailed deer found along the lower Clark Fork River show similar habitat preferences. During the mid to late 1930's, the Cabinet National Forest initiated "winter game studies" that identified 22 important deer winter ranges (original maps are on file Region One headquarters, MDFWP, Kalispell). All but six of the areas were located along the Clark Fork River bottom and the lower reaches of several important drainages (Duvendack 1935).

Meadows (1937) indicated, with deep snow conditions deer utilized Douglas-fir thickets, feeding on cedar and fir needles, mountain maple, serviceberry, lichens, and ceanothus depending on availability. Cedar furnished about 90 percent of the forage to the deer on the Dead Horse and Bull River units during late winters. White-tailed deer in the upper Thompson River area concentrated in the Douglas-fir/larch stands (Roemer 1938).

White-tailed deer were reported as the most numerous big game species west of Thompson Falls (Rognrud 1950a), wintering along the Clark Fork River and lower reaches of the lesser drainages. The map included in Rognrud's (1950a) report combined all the winter range areas identified by the Forest Service in the 1930's and delineated the entire Clark Fork River bottom as important winter range. Currently the valley bottomlands adjacent to the reservoirs and the lower reaches of the tributaries are still important winter range for white-tailed deer.

3) Population Status

The earliest estimates of deer populations were made by the Cabinet National Forest. Numbers of deer estimated for the entire Forest are available from 1919 to 1939 (Appendix A). These early figures represent the best judgment of the district personnel based on daily sightings and not on systematic surveys. These estimates are useful primarily for determining historic trends (increases and/or declines) of the deer populations. These estimates document the increasing trend in deer populations during the early 1900's.

Estimates made during the period 1934-1938 were likely more accurate since the Forest Service hired personnel to make estimates of deer populations based on browse surveys and specific counts. Estimates for each winter range area were combined for each year to give a total estimate for the lower Clark Fork River (Table 2). Using the three years data, an average figure of 1,707 deer was calculated from the three years data.

Population estimates of big game species were made by Montana Department Fish and Game during the early 1950's (Couey 1951, 1952, 1953, 1955). Estimates for the Clark Fork Management Unit (including the lower sections of the Flathead and St. Regis rivers) indicated a sharp increase in white-tailed deer numbers by the mid-

Table 2. Population estimates of deer found on winter range along the Clark Fork River from winter game studies.

1934-1935	Total number of deer for entire forest	Number estimated along Clark Fork
1934-1935[1]	8,342	1,525
1935-1936[2]	10,300	1,875
1936-1937[3]	9,997	1,721

1 Duvendack (1935)
2 Roemer (1936)
3 Meadows (1937)

1950's (Appendix B). Thus, a larger number of deer apparently occupied the area affected by the Noxon Rapids Dam, than in the previous years. It was assumed the numbers of white-tailed deer were also increasing in the late 1940's prior to the construction of the Cabinet Gorge Dam. This indicated a potentially high level of impact to the white-tailed deer population due to construction of the dams and inundation of habitat capable of supporting them.

Winter range surveys conducted by Montana Dep. Fish and Game personnel during the winter of 1950 provided the best estimates of white-tailed deer populations before the construction of either the Cabinet Gorge or Noxon Rapids dams. Rognrud (1950a) surveyed the area from Beaver Creek to the Montana-Idaho border and estimated 1,375 white-tailed deer in the bottomlands along the Clark Fork River and the mouths of the lesser drainages. Of that total, 700 white-tailed deer were found strictly along the Clark Fork River.

4) <u>Assessment of Impacts</u>

The major negative impact on the white-tailed deer population due to the two hydroelectric projects on the lower Clark Fork River has been the inundation of important winter range. Loss of important white-tailed deer winter range due to the construction of the Noxon Rapids project was recognized by Montana Department of Fish and Game biologists (Mont. Dep. Fish, Wildl. and Parks, unpubl. files). It was estimated 10-15 square miles of winter range would be inundated, representing a 10 percent reduction in winter range. This 10 percent reduction represented the most critical portion of the winter range (O'Claire 1955).

From analysis of aerial photos taken before construction of the Cabinet Gorge and Noxon Rapids dams, it is evident important habitat components of winter range were within the boundaries of the projects. Inundation of bottomland cedar-hemlock, Douglas-fir/larch/ponderosa pine and mixed coniferous-deciduous stands represented a loss of important white-tailed deer winter concentration areas. Associated riparian grass and upland shrub habitat types were also inundated and received variable deer use during spring (R. Henderson 1983, pers. commun.).

No specific post-construction population estimates are available; however, harvest records for Hunting District 12 indicate a steep decline of 1,541 deer between 1957 and 1961 (Mont. Dep. Fish, Wildl. and Parks, unpubl. files). This hunting district included the lower Clark Fork River area, as well as, the Thompson River area. No information was available to explain the decline in the harvest numbers, although it was assumed at least part of the reduction may have been attributable to inundation of habitat. U.S. Forest Service population estimates for the Trout Creek Ranger district during the construction years for the Noxon Rapids Dam (1956-1959) indicated the population doubled (Table 3). This indicated a likely movement to adjacent habitats during project con

Table 3. U.S. Forest Service estimate of white-tailed deer in the Trout Creek Range District.[1]

Year	Estimate
1951	600
1952	700
1953	750
1954	900
1955	900
1956	1000
1957	2000
1958	2000
1959	2000

[1] Weckwerth 1959.

struction which stressed these habitats (assuming the habitats were already supporting the maximum number of deer).

The second impact has been the loss of deer by drownings in the ice covered reservoirs. According to a long-time resident, prior to impoundment the Clark Fork River remained open during the winter except for a few backwater areas (P. McKee 1983, pers. commun.). Deer were frequently observed swimming the river. A major crossing occurred near Trout Creek where deer moved to the 20-Odd Mountain and Copper Point areas (Meadows 1937). With the creation of the reservoirs and resultant slowing of the river, most of the lower Clark Fork River is ice covered during winter (Huston 1965). The ice covered reservoirs result in drownings as deer try to cross and fall through areas of thin ice. A. H. Cheney (1983, pers. commun.) and L. Smith (1983, pers. commun.) both recalled an incident of 35 white-tailed deer drowning just east of Thompson Falls. Faye Couey (1983, pers. commun.) and Merle Rognrud (1983, pers. commun.), both retired Montana Dep. Fish and Game biologists, also recalled reports of deer drowning. Chester Lamoreux, the current Montana Dep. Fish, Wildlife and Parks warden, receives many reports of drownings during severe winters. Mr. Lamoreux (1983, pers. commun.) recalled one incident of 13 deer found in Vermilion Bay. All persons interviewed believed the losses were more significant during severe winters. When considered over the lifetime of the reservoirs, the total losses contribute to a sizeable loss of deer. The actual magnitude of deer losses due to drowning is speculative in the absence of more quantified data.

5) Estimated Losses Due to the Projects

- Quantitative loss estimates (losses reported indicate a loss of the ability of the habitat to support these numbers):

	Cabinet Gorge	Noxon Rapids
Acres of winter range inundated	2,383	5,790
No. white-tailed deer lost (0.08-0.18 deer/acre)	191-429	463-1,042

- Qualitative loss estimate of high was assessed due to the impacts of both reservoirs.

6) Derivation of Loss Estimates

Several assumptions were made in order to estimate white-tailed deer losses.

1) The most significant impact to the white-tailed deer populations occurred because of the loss of important winter range. It is assumed adjacent winter range was at carrying capacity.

2) Deer were evenly distributed throughout the winter range. This is a simplified statement of complex habitat use, but necessary in order to calculate deer numbers per acre with available information.

3) Deer densities were similar throughout the lower Clark Fork River.

4) Density estimates from other areas in northwestern Montana are comparable to the lower Clark Fork River area. Areas used for comparison were selected based on location (all occurred in northwestern Montana) and similar habitat.

5) Early population estimates made by the Forest Service were useful in determining range of figures.

These assumptions were necessary in order to make reasonable estimates based on available information.

Density estimates from deer studies in northwestern Montana were used to develop the loss estimates. Using strip count methods, McDowell (1950) reported density figures of 0.13 deer/acre in 1949 and 0.18 deer/acre in 1950 for white-tailed deer wintering in the Thompson River drainage. After five years of research on white-tailed deer in the Swan River Valley, Mundinger (1983, pers. commun.) believes a density of 100 deer per square mile (0.156 deer/acre) is a realistic estimate for winter range. Janke (1977) and Slott (1979) studies from the Clearwater River area also likely reflect conditions found in the Thompson Falls vicinity. They reported density estimates of 0.08 and 0.12 deer/acre on winter range. Lacking pre-impoundment, site specific deer density estimates, a region-wide range of densities was used to give the best estimates for the lower Clark Fork River area. The low and high density estimates were used to set the bounds of the loss estimate range. The densities range of 0.08 and 0.18 (deer/acre) was combined with the acres of winter range inundated by each reservoir to determine the loss estimates. The acreage figures were determined by first calculating the net loss of terrestrial habitat acres (including marshes-sloughs), thus giving the projects credit for acres enhanced.

Cabinet Gorge	Noxon Rapids
2,700 acres inundated	6,900 acres inundated
-117 acres enhanced	-50 acres enhanced
2,583 acres net loss	5,950 acres net loss

The habitats not likely to have been utilized by white-tailed deer for winter range were subtracted from this figure. Habitats not utilized included cliffs and gravel bars; it was assumed the other terrestrial habitats were utilized during winter. The density range was then combined with the acreage figures to determine the loss estimates:

	Cabinet Gorge	Noxon Rapids
Net acres	2,583	5,950
- cliffs, gravel bars	200	160
Total white-tailed habitat	2,383	5,790
Density range	0.08-0.18	
No. deer (habitat x density)	191-429	463-1,042

To determine qualitative loss estimates, criteria (a), (b), and (d) on page 8 were considered. The habitat inundated was seasonally important to wintering deer, and it was assumed adjacent winter range was at carrying capacity and thus unavailable for displaced deer. Also, the calculated white-tailed deer numbers were compared to the estimated populations at the time of construction. A large portion of the estimated deer populations was impacted by the Noxon Rapids and Cabinet Gorge projects and was the basis for assessing the high impacts.

C. MULE DEER

1) Introduction

The early historical records for deer reported in the previous section (white-tailed deer) undoubtedly included a percentage of mule deer. Mule deer were native to the Clark Fork River area and were present during the construction of the two projects. In the various wildlife reports mule deer were not distinguished from white-tailed deer until the U. S. Forest Service records of 1937 (Weckwerth 1959).

2) Seasonal Habitat Preference

Early Forest Service winter game studies indicated important deer winter range occurred along the Clark Fork River and the lesser drainages. Mule deer wintered at the higher elevations within these ranges, above the white-tailed deer concentrations (Roemer 1936). Deer started to concentrate on winter ranges by December 15, seeking south slopes. As snow became deeper, deer concentrations on the lower slopes became greater and were greatest during late winter (Duvendack 1935). Rognrud (1950a) reported finding mule deer at the higher elevations of known winter ranges in his surveys of the Noxon area. A more recent document, Mackie et al. (1976), reported mule deer wintering in each of several creeks of the Clark Fork drainage. Typically mule deer occurred at mid to upper slopes and in close association with old burns. The timbered areas were dominated by ponderosa pine and Douglas-fir.

Little information exists on other seasonal habitat use by mule deer in the lower Clark Fork River area. Meadows (1937) reported, during spring, deer concentrated on the bottoms along the river and at low elevations where green grass had begun to appear in abundance. A percentage of these deer were probably mule deer as evidenced by a more recent study. Henderson (1983, pers. commun.) radio-collared mule deer in the 20-Odd Mountain area and monitored their use of the bottomlands from late March through May. All of the radio-collared mule deer occupied the habitats adjacent to the reservoir during spring and a few of the deer remained on the lower bottoms throughout the summer. It is assumed the inundated habitats would have been utilized by the mule deer.

These spring "green-up" areas provided nutritious forage necessary to ensure good physical condition prior to parturition and lactation. The importance of high quality spring range and increased productivity in deer has been documented (Cheatum and Severinghaus 1950).

3) Population Status

Status of the mule deer population in the Noxon area was not well known (Rognrud 1950a). McDowell (1949) was able to estimate 1,600 mule deer for the Thompson Falls area (excluding the Cherry

Creek Game Preserve). Montana Dep. Fish and Game estimates for mule deer in the entire Clark Fork Management Unit are reported in Appendix B.

4) Assessment of Impacts

Available data did not indicate loss of any known mule deer winter range due to inundation. However, the loss of important spring habitat had a negative impact on the mule deer population. Approximately 1,420 acres of grassland and hay meadows (Table 1), sites of early spring "green-up", were inundated. Inundation of these seasonally important areas, which provided nutritious forage during the crucial period prior to parturition and lactation, adversely affected the mule deer population by eliminating this resource and causing the deer to likely subsist on poorer quality range. The loss of the low elevation bottomland areas, sites of the earliest "green-up", forced the deer to occupy more dormant, higher elevation ranges. Mautz (1978) summarized the importance of high quality seasonal range and the effects on fawn size and fawn survival.

5) Estimated Losses Due to the Projects

- Quantitative loss estimates for mule deer were based on the loss of important spring range:
  - Cabinet Gorge - 320 acres
  - Noxon Rapids - 1,100 acres
- Qualitative loss estimates of moderate was assessed for both projects.

6) Derivation of Loss Estimates

Quantitative loss estimates for mule deer were based on the acreage loss estimates of grassland-hay meadows representing spring range. Approximately 320 acres and 1,100 acres of spring range were inundated by Cabinet Gorge and Noxon Rapids reservoirs, respectively. Criteria (b), (c), and (d) on page 8 were considered to develop the qualitative loss estimate of moderate for both projects.

D. ELK

1) Introduction

Elk were uncommon in the lower Clark Fork River valley during the early 1800's. David Thompson made no mention of elk during his second winter near Thompson Falls (White 1950). Elk populations apparently increased by the late 1800's, as one Thompson Falls resident wrote that elk were abundant (Dufresne 1976).

In 1912, thirty-eight elk from Yellowstone National Park were released a few miles east of Thompson Falls to augment the native herd. In 1933 the Cherry Creek Game Preserve was created to provide sanctuary for the growing elk herd and by 1949 the herd had nearly doubled in siz and severe overuse of winter range was noted (Rognrud 1950b). The preserve was abandoned in 1950, and the elk dispersed westward (Rognrud 1950b). Introductions of 75 elk near the Vermilion River in 1951 and 28 elk near McKay Creek in 1960 further increased the herd. A large elk population currently occupies areas on the north and south sides of the lower Clark Fork River.

2) Seasonal Habitat Preference

Habitat use in the lower Clark Fork River area during winter was described in several reports (Duvendack 1935, Dowell 1949). South slopes at mid elevations were selected during normal winters. Elk concentrated on lower slopes as snow became deeper during late winter (Duvendack 1935). During periods of severe winter conditions elk moved into the creek bottoms and flats along the Clark Fork River when deep, crusted snow made foraging impossible on the lower slopes (McDowell 1949). Use of bottomlands by elk during severe winter conditions and the potential for interspecific competition with white-tailed deer has been noted on other northwestern Montana big game winter ranges (Blair 1955).

Elk disperse from their winter concentrations onto spring range including the sites of early "green-up". Diverse scattered habitats are utilized through fall.

3) Population Status

Early U. S. Forest Service records document the estimates of elk populations (Appendix A). Cabinet National Forest records indicated a sharp increase in elk numbers following the establishment of the Cherry Creek Game Preserve in 1933 (Appendix C). Population estimates were also available for the Noxon and Trout Creek ranger districts (Appendix D). The estimates suggest increasing elk numbers from 1951 (75 elk) to 1959 (700 elk). Montana Department of Fish and Game estimates for the Clark Fork Management Unit indicated increased numbers of elk from 1950 (2,830) to 1954 (4,170) (Appendix B).

4) Assessment of Impacts

Importance of creek and river bottomlands to elk during severe winters has been documented in the lower Clark Fork River area (McDowell 1949) and other northwestern Montana winter ranges (Blair 1955). Inundation of grassland-hay fields and the shrub fields eliminated these winter foraging areas from the available winter range for elk. Because of the relatively low numbers of elk present at the time of construction of both the Cabinet Gorge and Noxon Rapids projects, the actual level of use of the habitats prior to inundation was not documented.

Another impact concerns the hazards to elk crossing the reservoir, a problem recognized with water development projects in the lower Clark Fork River (U.S. Dep. Inter. 1966). Incidents of elk drowning in the Thompson Falls reservoir during ice covered periods have occurred (A. Cheney 1983, pers. commun., L. Smith 1983, pers. commun., R. Henderson 1983, pers. commun., C. Lamoreux 1983, pers. commun.) and it is likely drowning incidents have occurred in the Cabinet Gorge and Noxon Rapids reservoirs. However, without actual documentation of specific incidents, it is difficult to assess the level of impact.

5) Estimated Losses Due to the Projects

A minimal number of elk were estimated to be lost from the population due to inundation of habitat. In lieu of good population and habitat use data, the impact assessment reflects the loss of the most important feeding habitats utilized during winter.

- Quantitative loss estimate for elk was based on the loss of winter range:

	Cabinet Gorge	Noxon Rapids
grassland-hay meadow	320	1,100
upland shrub	0	530

- Qualitative loss estimate of low was assessed for both projects.

6) Derivation of Loss Estimates

A minimal number of elk were estimated to be lost from the population due to inundation of habitat. In lieu of good population and habitat use data, the impact assessments reflect the loss of the most important feeding habitat utilized during winter. Quantitative loss estimates for elk were based on the acreage loss estimates of the grassland-hay meadow and upland shrub habitat types for both reservoirs. Although other habitats are utilized by elk for winter range (i.e. bottomland forests for thermal cover), the loss estimates were limited to those habitats known to be most critical. The grassland-hay meadows were also extensively utilized by elk during spring "green-up". Criteria (a) and (b) on page 8 were considered to develop qualitative loss estimates. A qualitative loss estimate of low was assessed for both projects. Due to the low elk populations present during construction of the two projects, only a minimal number of elk were adversely affected by loss of habitat.

E. BLACK BEAR

1) Introduction

Black bears were historically common in the lower Clark Fork River area. The earliest attempt to estimate their population was made by the U.S. Forest Service in 1921 (Appendix A). Reports of increasing numbers of black bears coincided with the extensive domestic sheep grazing on Forest Service lands following the 1910 fire. Early sheep ranchers reported many incidents of bear-sheep conflicts along the river and creek bottomlands (P. Harlowe 1983, pers. commun.). Apparently a number of bears, both black and grizzly, were shot during this period; however, no records of actual numbers harvested were kept. Sheep grazing on Forest Service lands continued through the 1940's.

2) Seasonal Habitat Preference

No detailed study of habitat use by black bears in the lower Clark Fork River area was available. Only broad generalizations were reported in existing big game references, i.e. "black bears are common throughout the Thompson Falls district" (Weckwerth 1959).

Studies in the Whitefish Range of northwestern Montana determined permanent home ranges were found in forested, low elevation areas (Jonkel and Cowan 1971). These forested habitats were sites of old burns in various seral stages. Stream bottoms and meadows were seasonally used in early and mid-summer (Jonkel and Cowan 1971). These riparian areas were particularly important as sites of high nutritional forage, influencing reproductivity of black bears. Rogers (1974) suggested a relationship between nutritional inadequacy and reduced productivity due to smaller litters, reduced frequency of litters and a raising of the minimum breeding age.

Riparian areas also provide important denning sites. The base of a hollow tree was the site most often used in denning (Jonkel and Cowan 1971). In the Fisher River bottomlands, the majority of black bear dens were found at the base of hollow cottonwoods (Gillespie 1977).

3) Population Status

U.S. Forest Service estimates for the entire Cabinet National Forest were available for the years 1921-1939 (Appendix A). These estimates suggest a trend of increasing numbers of black bears by the late 1930's following a population decline in 1931. Estimates made by Montana Dep. Fish and Game for the Clark Fork Management Unit suggest a decline in black bear numbers from 1950 (1,325) to 1954 (825) (Appendix B). No reliable population estimates for black bears occupying the project areas prior to inundation were available.

Jonkel and Cowan (1971) determined black bear densities in spruce-fir forests of northwestern Montana. Densities for three years were as follows: 1960 - 1.0 bear per 640 acres; 1961 - 1.25 bear per 640 acres; 1966 - 0.6 bear per 640 acres. A reasonable estimate for the lower Clark Fork River area would be one bear per 640 acres (C. Jonkel 1983, pers. commun.).

4) Assessment of Impacts

Approximately 8,700 acres of wildlife terrestrial habitat (including wetland areas) were inundated by the two hydroelectric projects. According to Jonkel and Cowan (1971), this represents a loss of permanent home range sites, as well as seasonally important forage areas for additional bears. Inundated areas included grassland-hay meadows and shrub types (Table 1) that were probably used by black bears during spring (grass/forb types) and late summer/-fall (berry producing shrub types). These seasonally important areas provided high quality habitat which has been determined to regulate the reproductive success of black bears (Rogers 1974). Female black bears on good to high quality habitat not only obtain sexual maturity at an earlier age, but also have a greater reproductive rate. Survival of young and yearling bears is also greater during years of good food production. Additionally, the inundation of cottonwood trees removed possible denning sites known to be utilized by bears in other areas of northwestern Montana (Gillespie 1977).

5) Estimated Losses/Gains Due to the Projects

- Quantitative loss estimate for black bears was based on the loss of important foraging areas:

	Cabinet Gorge	Noxon Rapids
Spring range		
grassland-hay meadow	- 320	- 1,100
slough-marshes	+ 97	+ 50
Net acres lost	- 223	- 1,050
Late summer-fall range		
deciduous tree-shrub	- 330	- 410
upland shrub	---	- 530
Net acres lost	- 330	- 940

- Qualitative loss estimate of moderate was assessed for both projects.

6) Derivation of Loss Estimates

Lacking any site specific pre-impoundment population density estimates for black bears, the loss estimates were based on the loss of spring and summer/fall foraging habitats. The acreage figures from Table 1 were used to determine the losses. Net losses of 223 acres and 1,050 acres of spring range were determined for Cabinet Gorge and Noxon Rapids reservoirs, respectively. Grassland-hay meadows habitat for Cabinet Gorge and Noxon Rapids was 320 acres and 1,100 acres, respectively. The net acres of slough-marshes determined to have been enhanced were combined with the grassland-hay meadow acres lost to calculate the net loss of spring range. Similarly, the net loss of late summer-fall range for Cabinet Gorge (330 acres) and Noxon Rapids (940 acres) reservoirs was determined by considering the loss of the two habitats containing berry producing shrubs, the deciduous tree-shrub and the upland shrub types. No acres of either of these types were determined to have been enhanced. No loss estimates were developed for the impact created by to the loss of den sites.

Criteria (a), (b), and (c) on page 8 were considered during the development of the qualitative loss estimate. An overall qualitative loss estimate of moderate was assessed due to the combined impacts of both projects. Inundated habitats provided home range sites, as well as high quality seasonal forage areas, which influenced the reproductive success and survivability of black bears utilizing these areas.

F. GRIZZLY BEARS

1) Introduction

Grizzly bears, a threatened species in Montana (U.S. Endangered Species Act 1973) have historically inhabited the Clark Fork River drainage. U.S. Forest Service (U.S. Dep. Agric. 1974) show the approximate locations of 89 historical observations. Most locations were north of the river at higher elevations; however, one grizzly bear kill was recorded at Trout Creek in 1953 (Rognrud 1954). Later observations in the 1970's and 1980's record grizzly bears in the lesser drainages on the south side of the river (C. Jonkel 1984, pers. commun., U.S. Forest Service files, Thompson Falls ranger district). A known grizzly bear population currently occupies the Cabinet Mountain Range adjacent to the lower Clark Fork River (W. Kasworm 1983, pers. commun.).

2) Seasonal Habitat Preference

Specific habitat use by grizzly bears in the Clark Fork drainage is unknown. A current research project in the Cabinet Mountains will determine habitat preference. Studies from other areas in Montana have described the seasonal habitat preference of grizzly bears. After emergence from their dens in the spring, grizzly bears select snowchutes, ridgetops and low elevation riparian areas where succulent forage-high in proteins, sugars and fats - is readily available (Jonkel 1982). Mealey et al. (1977), Singer (1978), and Servheen (1983) documented the importance of stream bottoms, wet seeps, and alluvial areas during the spring. These areas support diverse communities of mesophytic shrubs, forbs and grasses. Forested areas containing these same types of plants, as well as security cover, are also heavily utilized by grizzly bears (Mealey et al. 1977). Succulent vegetation reduces the physiological stress grizzly bears undergo during the weight loss period from den emergence to early summer when the berries start to ripen (Jonkel and Cowan 1971). In some areas, big game carrion is an important spring food (Jonkel 1982).

During summer, many bears follow the "green-up" to higher elevation. As the various berries ripen in mid-summer, the bears take advantage of this abundant, nutritious food supply to improve their physical condition prior to denning (Jonkel 1982). The shrubfields at the lower elevations ripen earlier and produce a downward movement of the bears (Pearson 1975).

Fall is a crucial time for bears because they must gain weight in preparation for denning (Jonkel 1982). Rogers (1974) reported a positive correlation between berry and mast production and the productivity of black bears; it is assumed a similar relationship is true for grizzly bears. During late fall, bears are forced to lowland habitat where they take advantage of the available food (berries and succulent vegetation). Singer (1978) observed a fall concentration of grizzly bears along the North Fork of the Flathead River in northwestern Montana.

Many factors affect the time of den entrance; however, generally grizzly bears enter dens in November, often following a heavy snowfall (Craighead and Craighead 1972). Dens are characteristically located at high elevations in remote areas with steep slopes, deep soils, and heavy snow accumulations (Pearson 1975).

3) Population Status

Population estimates from U.S. Forest Service records dated 1922-1939 (Appendix A) indicate a small grizzly bear population within the Cabinet National Forest. A general decline in numbers was noted after 1930. Between 5 to 25 grizzly bears were estimated by the Trout Creek and Noxon ranger districts during the Cabinet Gorge and Noxon Rapids dams project years (Weckwerth 1959). Montana Department of Fish and Game estimates of grizzly bears in the Clark Fork Unit were as follows: 1951 - 18; 1952 - 25; 1953 - 40, and 1954 - 20 (Appendix B).

4) Assessment of Impacts

Habitats inundated by the two hydroelectric projects included seasonally important areas for grizzly bears. In particular, the riparian areas were "key" habitat for bears during spring (C. Jonkel 1983, pers. commun.). The shrub areas (including the upland shrubfields and the deciduous shrub riparian areas) supplied berries utilized by bears during late summer and fall. These areas provided high quality habitat which has been determined to regulate the reproductive success of black bears (Rogers 1974); it is likely a similar relationship occurs with grizzly bears. A few acres of spring habitat (sloughs-marshes) were enhanced by the reservoirs, particularly the Cabinet Gorge project.

Although studies have focused on the north side of the river (U.S. Dep. Agric. 1974, Erickson 1976), the recent observations of grizzly bears on the Thompson Pass and Heron area (south of the Clark Fork River) suggest that grizzly bears may have utilized these areas during the 1940's and 1950's (C. Jonkel 1984, pers. commun., U.S. Forest Service files, Thompson ranger district). The creation of the two reservoirs may have disrupted travel corridors of bears utilizing both sizes of the river. Isolation of small populations of grizzly bears would have a detrimental impact on the overall status of the population (C. Jonkel 1983, pers. commun.).

5) Estimated Losses/Gains Due to the Projects

- Quantitative loss/gain estimates for grizzly bears was based on the loss of seasonally important foraging areas:

	Cabinet Gorge	Noxon Rapids
Spring range		
grassland-hay meadow lost	- 320	- 1,100
marsh areas enhanced	+ 97	+ 50
Net acres lost	- 223	- 1,050
Summer range		
deciduous tree-shrub lost	- 330	- 410
upland shrub lost	0	- 530
Net acres lost	- 330	- 940

- Qualitative loss estimate of low was assessed due to the impacts of both reservoirs.

6) Derivation of Loss Estimates

The quantitative loss estimates were based on the calculated acreages of certain habitats found in Table 1. The habitats selected characterized the seasonal ranges affected by the two projects. It was assumed the grassland-hay meadow habitat type was a component of grizzly bear spring range. The acres of marsh-sloughs enhanced by the two projects are also components of spring range. Net acreage for spring range was determined by substracting the acres enhanced (Cabinet Gorge - 97 acres; Noxon Rapids - 50 acres) from the acres inundated (Cabinet Gorge - 320 acres; Noxon Rapids - 1,100 acres).

It was assumed the upland shrub and the deciduous tree-shrub habitat were components of the summer/fall range. No components of summer/fall range were determined to have been enhanced, thus the net acreage reflects the inundation of shrub areas for Cabinet Gorge (330 acres) and Noxon Rapids (940 acres).

Criteria (a), (b), and (c) on page 8 were considered during the development of the qualitative loss estimate. An overall qualitative loss estimate of low was assessed due to the construction of the two dams. Inundation of spring and late summer/fall habitat removed key seasonal use areas capable of supporting an unknown number of grizzly bears. Historically low population numbers suggest few grizzly bears occupied the impact area.

G. MOUNTAIN LION

1) Introduction

The Clark Fork area has always been good mountain lion habitat (M. Hornocker 1983, pers. commun.). The historical presence of mountain lions in the Clark Fork drainage system has been documented. Roemer (1936) reported Albert Sales killed over 500 mountain lions in the Thompson River area during his 40 year trapping career. Mountain lion sign was noted during surveys of winter ranges (Duvendack 1935, Meadows 1937, Roemer 1936, 1938).

Use of river bottomlands (M. Hornocker 1983, pers. commun.), as well as upland coniferous forests on the South Fork of the Flathead drainage (Hornocker and Hash 1982) has been documented. Mountain lions probably utilized the areas inundated by the two projects as these areas supported concentrations of big game animals during winter, and white-tailed deer and mule deer comprised the primary food source. Hoffman and Pattie (1968) noted mountain lion distribution and abundance in Montana is closely tied to deer populations. No mountain lion population estimates were available.

2) Assessment of Impacts

Loss of habitat capable of sustaining the prey base (white-tailed deer and mule deer) would have a detrimental effect on the mountain lion population (M. Hornocker 1983, pers. commun.). Additionally, the disruption of mountain lion territories would have a negative impact on the population. It is believed the disruption of mountain lion territories by the loss of habitat or prey base (i.e. inundation of habitat by a reservoir) would displace individuals and have an adverse effect on lions occupying adjacent territories. The overall disruption of the territorial behavior would have a negative impact on the mountain lion population (M. Hornocker 1983, pers. commun.).

3) Estimated Losses Due to the Projects

- Quantitative loss estimates for mountain lions were based on the loss of the primary prey species:

	Cabinet Gorge	Noxon Rapids
- No. of white-tailed deer lost	191-429	463-1042
- Acres of spring range for mule deer lost	320	1100

- Qualitative loss estimate of moderate was assessed due to the impact of both projects.

4) Derivation of Loss Estimates

Lacking specific population estimates, it was necessary to develop the loss estimates for mountain lions based on the loss of primary prey species. White-tailed deer and mule deer losses were described previously in other sections, and these losses were incorporated into the mountain lion losses. It was not possible to quantify the effect of disruption of the territories.

H. BOBCAT

1) Introduction

Bobcats probably utilized the habitats inundated by the two projects. The abundant small mammal and bird populations associated with riparian habitats provided a prey base for resident bobcats. No current information is available to describe bobcat use of the remaining habitat; however, a current graduate student project in the area may define specific habitat requirements.

2) Population Status

No population estimates were available; however, a Forest Service wildlife management plan reported bobcats were increasing and were killed in considerable numbers by local residents along the lower Clark Fork River in 1956 (U.S. Dep. Agric. 1957).

3) Assessment of Impacts

Inundation of the riparian areas and adjacent upland habitats, and subsequent loss of the prey base supported by these habitats likely resulted in a detrimental impact on the resident bobcats (H. Hash 1983, pers. commun.).

4) Estimated Losses Due to the Projects

- No quantitative loss estimates were determined due to lack of available data.

- Qualitative loss estimate of moderate was assessed due to the combined impact of both projects.

5) Derivation of Loss Estimates

No quantitative loss estimates were determined, although it was recognized negative impacts occurred (loss of prey base). It was agreed, during coordination meetings, adequacy of mitigation for bobcats will be assessed by interagency review during Phase 2. It is likely mitigation aimed at other target species will include habitat manipulations which may result in an increased prey base adequate to offset negative impacts to bobcats.

An overall qualitative loss estimate of moderate was assessed for both projects based on criteria (a), (b), and (d) on page 8. A ranking of moderate reflects the inundation of a large amount of riparian and adjacent upland habitat capable of supporting a variety of prey species necessary to sustain resident bobcats. Without additional information, it was assumed some bobcats continue to occupy the remaining bottomlands.

I. RIVER OTTER

1) Introduction

Historical records document the presence of river otter in the lower Clark Fork River drainage (Ferris 1873, U.S. Dep. Agric. 1919-1941). A longtime trapper of the 1920-1960 period, Carl Holmes, apparently trapped a number of river otter in the lower Clark Fork River prior to construction of the two projects (R. Browne 1983, pers. commun.). Currently, one river otter has been sighted in the Martin Bay area of Noxon Reservoir (R. Woodworth 1983, pers. commun.). Adjacent areas are known to support otters. U. S. Forest Service biologist Jerry Deibert (1983, pers. commun.) reports otters are found in the river reach near Plains (upstream from Thompson Falls). Three otter were trapped in the Thompson River during the past two years (S. Riley 1983, pers. commun.).

2) Seasonal Habitat Preference

From studies of otters in Idaho, Melquist and Hornocker (1983) found otters preferred valley to mountain habitats, and stream-associated habitats to lakes, reservoirs and ponds. Studies in southwestern Montana also described the use of major rivers by otters (Zackheim 1982). Undercut banks and dense riparian vegetation were important components of the river habitat. Fish were the most important prey species with kokanee salmon (*Oncorhynchus nerka*), largescale sucker (*Catostomus macrocheilus*), and mountain whitefish (*Prosopium williamsoni*) the three major fish species occurring in the diets of otters in the Payette River drainage of Idaho (Melquist and Hornocker 1983).

Seasonal habitat use was described by Zackheim (1982) and Melquist and Hornocker (1983). Open marshes, swamps and backwater sloughs found along rivers were used most often during summer, while unobstructed forest streams were used during winter. Activity centers were often located at log jams, especially during the fall. Den and resting sites were selected based on the protection and seclusion they provided. Active and abandoned beaver bank dens and lodges were used more often than any other kind of den or resting site. Dense riparian vegetation was also a preferred resting site.

3) Population Status

The Cabinet National Forest estimated five otters per year from 1938-1941 for the entire forest (U.S. Dep. Agric. 1919-1941). Montana Department of Fish and Game harvest records for the years 1956-1964 ranked District 1 (northwest Montana) second in total harvest, with the annual harvest ranging from 14-25 otters with an average of 17.4 otters (Rognrud 1964).

Studies in west central Idaho provided the only density estimates for river otter in the northern Rocky Mountains (Melquist and Hornocker 1983). Based on their studies of the Payette River drainage, they reported a density range of one otter per 2.7-5.8 km for all habitats considered (including streams, lakes, ponds, and reservoirs).

4) Assessment of Impacts

Transformation of a river habitat to a reservoir habitat resulted in the following impacts: 1) during clearing of the impoundment areas, riparian vegetation and natural obstructions such as log jams were removed; 2) reservoir fluctuations exposed bare banks and mudflats increasing the distance to escape cover; 3) initial reductions in beaver populations limited the number of bank dens and lodges available for otter den sites; and 4) the probable inundation of marshes, swamps and sloughs removed summer foraging areas, although these areas were not identifiable in the aerial photos. A net gain in these habitats (Table 1) was estimated; however, the created marshes and sloughs were generally isolated from other preferred habitats (rivers). The combined effect of these impacts has been detrimental to the river otter population. Reservoirs within the Idaho study area were virtually unused by otters because there was insufficient escape cover and resting sites along the shoreline (W. Melquist 1983, pers. commun.). The Idaho reservoirs were flood control and irrigation projects and may not directly compare to run-of-the-river projects which may more closely resemble a lake type habitat; however, lakes supported lower otter densities than valley stream (river) habitats (Melquist and Hornocker 1983).

5) Estimated Losses Due to the Project

- Quantitative loss estimates (losses indicate a loss of the ability of the habitat to support these numbers):

	Cabinet Gorge	Noxon Rapids
km of river impacted	32	61
no. of otters (otter/2.7-5.8 km)	6-12	11-23

- Qualitative loss estimate of high was assessed due to the impact of both reservoirs.

6) Derivation of Loss Estimates

Loss estimates were determined by combining the density range (1.0 otter/2.7-5.8 km) determined by Melquist and Hornocker (1983) with the length of river inundated by the Cabinet Gorge reservoir (32 km) and the Noxon Rapids reservoir (61 km). It was assumed the density range for the lower Clark Fork River fell within this range. Although one otter was observed in the Noxon Rapids reservoir, the loss estimates assume total loss of all river otters.

Existence of known otter populations will be considered during development of mitigation packages (Phase 2).

Criteria (a), (b), and (d) on page 8 were considered in the development of the qualitative loss estimate. Important seasonal use areas, as well as denning and resting sites were inundated. It was assumed no similar habitat was available for dispersing animals.

J. BEAVER

1) Introduction

Early records document the presence of beaver in the lower Clark Fork River area (Ferris 1873, White 1950). By the late 1940's beaver were common and found all along the Clark Fork River and the lower sections of the side drainages (Cooley 1957, A. Cheney 1983, pers. commun.). The first general beaver season occurred in the winter of 1953-1954. Population trends were monitored by aerial surveys and harvest information (Hawley 1957, 1958, Rognrud 1964).

2) Seasonal Habitat Preference

Beavers are known to occupy large rivers (Martin 1977) as well as small mountain streams. Due to the large volume of flow and the impossibility of construction of dams and lodges in rivers, most beaver reside in bank dens, although lodges and dams have been found in side channels and backwater areas.

Willow and young cottonwoods are the primary food source on western Montana rivers (Townsend 1953). Winter food supplies are stored in caches in deep water near den sites.

Little information is available on the use of reservoirs by beaver populations. However, a cooperative study funded by Montana Power Company, with the University of Montana and the U. S. Fish and Wildlife Service Cooperative Wildlife Research Unit should better describe the ecology of beavers occupying major rivers and reservoirs of eastern Montana. After one field season, use of reservoirs by beavers has been documented (R. Bown 1984, pers. commun.).

3) Population Status

Beaver populations in the Cabinet National Forest were estimated for the years 1939-1941. An increasing trend from 1,550 to 2,300 beavers was noted (U.S. Dep. Agric. 1939-1941).

Density estimates were available for the 1950's and are reported in Table 4. Montana Department of Fish and Game records indicated reduced beaver populations during 1956 in area 15, the lower Clark Fork River. Much of the stream surveyed fell within the Noxon Dam impoundment area and Fish and Game personnel reported, "the deterioration of the habitat in the impoundment area, through brush clearing operations, has been coincident with the decrease in number of colonies counted" (Hawley 1958:40). A decline in numbers of beaver harvested occurred during the construction years of Noxon Rapids Dam (Table 5) and may reflect reduced beaver numbers; however, other variables such as current fur prices and normal population fluctuations may have also been responsible for reduced harvest figures.

Table 4. Aerial colony counts of beaver trapping areas for Region 1 of Montana Department of Fish, Wildlife and Parks. Area 15 is the same as the lower Clark Fork River area.[1]

	Colonies per Mile				
Area	1953	1954	1955	1956	1957
11a	.67	1.11	--	.45	.53
12a	.83	.67	--	--	.83
13	--	--	--	--	.71
15	.67	.42	--	.11	.36
16a	.45	.63	--	.11	.52
17	.71	.45	--	.42	1.25

1 Hawley 1958.

Table 5. Numbers of beavers harvested in Region 1 (northwestern Montana).[1]

Year	Number
1954-55	2,000
1955-56	1,700
1956-57	1,100
1957-58	1,100
1958-59	1,100
1959-60	1,100
1960-61	2,100
1961-62	2,300

1 Rognrud 1965.

Current Montana Dep. Fish, Wildlife and Parks beaver cache surveys have focused on the area from Dixon to Thompson Falls (above both the Cabinet Gorge and Noxon Rapids reservoirs). However, one flight was made from Thompson Falls to Vermilion Bay (Noxon Rapids Reservoir) and 2 beaver caches were found. No extensive surveys of the reservoirs have been made.

4) Assessment of Impacts

Data indicated an initial reduction in beaver numbers during construction of Noxon Rapids dam. It is assumed a similar reduction occurred during construction of the Cabinet Gorge dam. Beavers currently occupy at least one of the reservoirs; however, it was assumed the densities are lower than found in the upstream free-flowing river. Based on limited data from one field season, lower densities of beavers occupying reservoirs compared to adjacent free-flowing rivers was observed (R. Bown 1984, pers. commun.). Loss of cottonwood and willows, and the effect of reservoir fluctuations on dens and food caches offer sub-optimal beaver habitat and is likely responsible for the reduced densities.

Indirect impacts have the potential to be more detrimental to the beaver population than the initial direct loss of resident beavers, as suggested by Martin (1977). Due to the operation of most reservoirs, regulated rivers do not exhibit peak flows, the primary influence responsible for the formation of new islands and gravel bars (Martin 1977). Loss of islands and gravel bars in turn results in loss of the associated early seral species, willows and cottonwoods, the primary food for beavers. Additionally, fluctuations of reservoir levels can expose bank dens, thereby increasing beaver losses by predation. Also, food caches may be washed away or frozen to the river bed, depending on the flow regime in winter (Martin 1977).

5) Estimated Losses Due to the Projects

- Quantitative loss estimates (Losses indicate an inability of the habitat to support these numbers due to dam construction and operation):

	Cabinet Gorge	Noxon Rapids
Miles of river inundated	20	38
No. of beaver colonies (0.30-0.63 colonies per mile)	6-13	11-24

- Qualitative loss estimate of moderate was assessed due to the combined impacts of both reservoirs.

6) Derivation of Loss Estimates

Pre-construction population indices of 0.30 and 0.63 colonies per mile for 1953 and 1954, respectively (Newby 1955), found on the Clark Fork River between Thompson Falls and Noxon, were used to estimate the range of colonies lost. These indices were combined with the miles of river inundated to estimate beaver colonies lost. This method assumed the areas inundated by two reservoirs were similar.

The loss estimate range assumes total loss of all beavers. The status of current beaver populations occupying the reservoirs will be considered during the development of mitigation alternatives (Phase 2). Criteria (a) through (d) on page 8 were considered in the development of the qualitative loss estimate. Initial impacts following construction of the two projects probably severely reduced the beaver populations and thus a qualitative estimate of high would be assessed. However, unknown densities of beaver currently occupy the reservoirs reducing the estimate to a moderate rating. Because of the immediate impacts of project operations by freezing of caches or flooding of dens and the long-term indirect impacts of loss of habitat capable of supporting beavers, a low qualitative loss estimate was considered too conservative.

K. BALD EAGLE

1) Introduction

No records were available to document bald eagle use of the lower Clark Fork River prior to the construction of the two dams. However, both Craighead (1983, pers. commun.) and Flath (1983, pers. commun.) believe the area had supported wintering populations of bald eagles and probably a few nesting pairs. Adjacent areas, the Bull River and Lake Pend Oreille, have historically (as well as currently) supported bald eagle populations (D. Flath 1983, pers. commun.).

Recent observations document bald eagle use of the lower Clark Fork River during winter (U.S. Dep. Inter. mid-winter bald eagle counts). Craighead and Craighead (1979) reported use of the ice-free areas of the lower Clark Fork during January. No nest sites are known to occur along the lower Clark Fork River.

2) Seasonal Habitat Preference

Habitat preference and food habits have been described by Craighead and Craighead (1979) for bald eagles on the Kootenai River. Riparian habitat was utilized for perching, hunting, and roosting. Generally trees of all species were used for hunting and nesting while cottonwoods were preferred for roosting. Gravel bars and shorelines were used for resting and foraging. During winters, bald eagles used open water areas for foraging.

A variety of food items were utilized (Craighead and Craighead 1979). Mountain whitefish were a primary food source during fall spawning runs, while big game carrion was utilized during winter. Turbine damaged fish were utilized year-round. Migrating waterfowl and resident upland birds were also utilized as food.

3) Population Status

No information was available to document bald eagle habitat use on the Clark Fork River prior to construction of the dams. However, the Clark Fork River was identified as a principle spawning area for kokanee salmon, bull trout (*Salvelinus confluentus*), and mountain whitefish prior to construction of the dams (Jeppson 1953). Bald eagles probably utilized the abundant food sources. Harlowe (1983, pers. commun.) recalled concentrations of "fish eagles" at Heron Rapids during fall spawning. The "fish eagles" were assumed to be bald eagles since osprey probably left the area prior to the October and November spawning periods.

Current surveys of mid-winter bald eagle use in the lower Clark Fork River area have been conducted by the U. S. Forest Service for the U.S. Dep. Inter. mid-winter counts (Appendix E). Bald eagles do use the area during summer, although density estimates are unknown.

4) Assessment of Impacts

The main impact associated with the formation of the Cabinet Gorge and Noxon Rapids reservoirs has been the loss of wintering habitat for bald eagles. Approximately 58 miles of river, which remained relatively ice-free, were replaced by reservoirs which partially or completely freeze over each winter. During periods of ice cover the availability of the food resource (fish and waterfowl) is reduced and limits the forage flexibility of the eagles during a time when the food resource may be a limiting factor. Craighead and Craighead (1979) found bald eagles only at ice-free areas on the Clark Fork River and the Kootenai River.

Other impacts associated with the reservoirs have been the loss of perching, hunting and nesting sites when the impoundment areas were cleared of conifer and deciduous forests prior to inundation. These impacts were minimized by the fact suitable sites still exist along the shores of the reservoirs.

5) Estimated Losses Due to the Projects

- Quantitative loss estimate for bald eagles is based on the loss of wintering habitat:

	Cabinet Gorge and Noxon Rapids
No. of bald eagles	9-17

- Qualitative loss estimate of moderate is assessed for both projects.

6) Derivation of Loss Estimate

Lacking site specific information on the lower Clark Fork River prior to inundation, it was decided the best method to assess the losses would be to compare density estimates of impounded areas to unimpounded areas based on available information. An average of the last three winters data for the two reservoirs supplied by the U.S. Forest Service was used to determine density for the impounded area. This figure was compared to current densities found on the unimpounded reach of the Clark Fork River based on U.S. Forest Service records (R. Krepps 1984, pers. commun.). An additional source (Craighead and Craighead 1979) was used as another comparison for open water (not ice covered) areas:

Impounded area Cabinet Gorge and Noxon Rapids Reservoir (3 years average	12 eagles	58 miles	eagle/4.83 mi

Unimpounded Area Clark Fork River (1983 data)	14 eagles	28 miles	eagle/2.00 mi
Clark Fork River Open water areas (Craighead and Craighead 1979)	---	---	eagle/2.70 mi

Based on this information, the expected number of eagles for the lower Clark Fork River without the reservoirs is 21-29 bald eagles (58 mi ÷ 2.00 and 2.70). The number of eagles currently observed during winter (average = 12) was substracted from the expected number (21-29) to determine the range of 9-17 bald eagles.

Criteria (a), (b), and (c) on page 8 were considered in the development of the qualitative loss estimate. An overall qualitative loss estimate of moderate was assessed for both dams. A higher ranking would have been assessed if the loss of nests could have been documented. Even so, a loss of 9-17 wintering bald eagles would be considered a significant impact on a endangered population.

L. OSPREY

1) Introduction

No records were available documenting the osprey populations present prior to the construction of the two hydroelectric projects on the lower Clark Fork River.

2) Seasonal Habitat Preference

Ospreys require riparian areas for nesting sites and their primary food source - fish. Several studies document the presence of osprey on rivers, lakes and reservoirs in Montana (Grover 1983, Hinz 1977, MacCarter and MacCarter 1979, Swenson 1981). Nesting occurs along the shor lines and small islands, with preferred sites including live or dead conifer trees, cottonwood snags, and power poles (MacCarter and MacCarter 1979).

3) Population Status

No population estimates were available to determine the status of the osprey prior to construction of the two dams. A marked decline in osprey due to poor hatching success related to pesticide use populations was documented in the eastern United States during the 1950's and 1960's (MacCarter and MacCarter 1979). A similar decline likely occurred in the western half as well for the same reasons, and may have been reflected in low numbers of osprey occupying the lower Clark Fork River areas prior to construction of the two dams.

Osprey are considered common within the area of concern and the population appears to be stable. Currently 20 active osprey nest sites are found along the reservoirs (D. Henry 1983, pers. commun.). In general, osprey numbers have increased since the early 1970's following the trend of other raptors since the ban of DDT, and the restricted use of other chlorinated hydrocarbon chemicals.

4) Assessment of Impacts

Increased use of reservoirs by osprey has been documented elsewhere in Montana (Grover 1983, Swenson 1981). It was assumed increased use would be found adjacent to the two lower Clark Fork reservoirs.

5) Estimated Losses/Gains Due to the Projects

- Quantitative loss/gain estimate of a net gain of 13 active nest sites was determined.

- Qualitative loss/gain estimate of moderate (positive) was assessed for both reservoirs.

6) Derivation of Gain/Loss Estimates

To determine the net gain or loss, the number of osprey nests expected to occur on the free-flowing Clark Fork River was calculated based on the density found on the Flathead River (0.12 nest/mi.; Klaver et al. 1982). It was assumed this density estimate reflected pre-dam conditions. The number of nests expected to occur (0.12 nest/mi for 58 miles = 7 nests) was subtracted from the currently observed number (20 nests) to estimate a net gain of 13 nest sites. A qualitative estimate of moderate (positive) was assessed because of the probable increase of osprey numbers as suggested by Grover (1983).

M. RUFFED GROUSE

1) Introduction

Ruffed grouse were probably the most common upland game bird inhabiting the impact area prior to inundation. The mixture of deciduous and conifer habitat types are typically utilized by ruffed grouse for yearlong habitat in northern Idaho, while nesting and brood rearing habitat was provided by the deciduous habitat types (Hungerford 1951). It was assumed similar habitat use occurred by the resident grouse population occupying the impounded areas.

2) Assessment of Impacts

Approximately 8,700 acres of terrestrial habitat were inundated when the two projects were completed. It was assumed ruffed grouse occupied a majority of the impact area. The loss of yearlong habitat capable of sustaining resident grouse populations had a negative impact on the grouse population.

3) Estimated Losses Due to the Projects

- Quantitative loss estimates for ruffed grouse due to the loss of yearlong habitat:

	Cabinet Gorge	Noxon Rapids
Utilized habitats (mixed conifer-deciduous forest; deciduous tree-shrub; upland shrub; grassland-hay meadow)	2,000 acres	3,340 acres
No. grouse (density range 0.11-0.21)	220-420	367-701

- Qualitative loss estimate of high was assessed due to the combined impacts of both reservoirs.

4) Derivation of Loss Estimates

Density estimates from various studies (Landry 1980) were reviewed to determine a reasonable estimate for western Montana. The density estimates summarized by Landry (1980) ranged from 0.07 to 0.55 grouse/acre. It was assumed the density range reported for northern Idaho (0.11-0.21 grouse/acre; Hungerford 1951) would most adequately reflect populations in western Montana. This density range was combined with the acreage of ruffed grouse habitat inundated by each reservoir. Acreages of specific habitat types (Table 1), known to be utilized by ruffed grouse, were compiled to determine total acres utilized for each project. The resultant acreage figures (Cabinet Gorge - 2,000 acres; Noxon Rapids - 3,340 acres) were combined with the density range (0.11-0.21 grouse/acre) to calculate the loss of 220-420 grouse for Cabinet Gorge and 367-701 grouse for Noxon Rapids.

Criteria (a) through (d) on page 8 were considered to develop the qualitative loss estimate. The estimate of high was assessed due to the inundation of important yearlong habitat and the resultant loss of resident grouse supported by the habitat. It was assumed adjacent habitat was unavailable or already supporting grouse at carrying capacity.

N. CANADA GOOSE

1) Introduction

No Canada goose breeding or migratory surveys, prior to construction of the two dams, were available. A. Cheney, (1983, pers. commun.), retired game warden, recalled observing geese on the river in the early 1950's. A Canada goose study was initiated in 1952 on Flathead Lake and Flathead River; although no intensive study was done below the town of Paradise, it was assumed the observed high populations of geese likely occurred throughout the lower Clark Fork River area (J. Craighead 1983, pers. commun.).

2) Season Habitat Preference

Canada geese found on the Flathead River selected islands as nesting sites; it was assumed geese found on the Clark Fork River exhibited similar preferences (J. Craighead 1983, pers. commun.). The use of islands by nesting geese has been documented on the Kootenai River in northwestern Montana (DeSimone 1980). Gravel bars are preferred loafing sites (Bellrose 1976). Backwater sloughs, grass meadows and agricultural bottomlands are utilized as brooding habitat (J. Ball 1983, pers. commun.).

3) Population Status

Population estimates were not available for the years prior to or immediately after construction of the two dams. Recent breeding pair surveys have been conducted by the U.S. Fish and Wildlife Service on the lower Clark Fork River (Table 6). Survey flights included all of the Noxon Rapids Reservoir, but not the Cabinet Gorge Reservoir.

4) Assessment of Impacts

Canada goose production was directly affected by the loss of suitable nesting sites. A minimum of 12 islands (297 acres) and numerous gravel bars were inundated, resulting in a direct loss of preferred nesting and loafing sites (Bellrose 1976). Important goose brood rearing areas were lost with the inundation of grasslands and hay meadows adjacent to the river (J. Ball 1983, pers. commun.). Negative impact to Canada goose production as a result of construction of hydroelectric projects has been documented. Bowhay (1972) reported a 67 percent reduction in the goose production the first year following construction of hydroelectric projects in Washington. Reduction of productivity was attributed to loss of nesting sites (islands) and reduced brood size. The impact attributable to the two lower Clark Fork River projects may have been partially offset by the creation of new islands. Fourteen islands totaling 38 acres were created. Thus 2 islands were gained, however, fewer acres were available for nest sites.

Table 6. U.S. Fish and Wildlife Service surveys of Canada goose nesting pairs found on the lower Clark Fork River.[1]

Year	Thompson Falls to Noxon		Plains to Thompson Falls	
	Total pairs	Pair/mile	Total pairs	Pair/mile
1976	34	.83	65	2.32
1977	48	1.17	75	2.68
1978	43	1.05	50	1.79
1979	57	1.40	94	3.36
1980	53	1.30	65	2.32
1981	53	1.29	62	2.21
1982	35	.85	31	1.10
1983	75	1.83	60	2.14
	$\bar{x}$ = 49.75	1.22	62.75	2.24

1 U.S. Department of Interior, Fish and Wildlife Service, unpublished data.

Food resources preferred by Canada geese were likely negatively affected by the formation of the reservoirs. Loss of sloughs and marshes reduced the aquatic vegetation and macroinvertebrate food resource. Changes in the species composition of macroinvertebrates due to impoundment of rivers has also been documented (Bonde and Bush 1982, McMullin 1979).

Formation of reservoirs may have had a positive impact by providing stop-over areas for migrating geese. Large open water areas attract geese (J. Craighead 1983, pers. commun.). The apparent increase in the goose population occupying the reservoirs (R. Henderson 1983, pers. commun., H. Knowlton 1983, pers. commun.) may reflect the general trend of increasing numbers of geese throughout the Pacific Northwest (J. Ball 1983, pers. commun.). Intensive management efforts on the Ninepipes Wildlife Refuge, Flathead Lake and the Flathead River may be responsible for the apparent increase on the lower Clark Fork River (R. Weckwerth 1983, pers. commun.).

5) Estimated Losses Due to the Projects

- Quantitative loss estimates were based on the loss of habitat capable of supporting the reported numbers of geese:

	Cabinet Gorge	Noxon Rapids
Miles of river	20	38
No. of goose pairs (density range 0.27 - 1.53) lost	5-31	10-58

- Qualitative loss estimate of moderate was assessed due to the impacts of both reservoirs.

6) Derivation of Loss Estimates

Breeding pair densities were calculated based on U.S. Fish and Wildlife Service counts from 1976-1983 (Table 6). It was assumed goose nesting pair densities found on the unimpounded river (Plains to Thompson Falls) represented conditions prior to construction of the two reservoirs. Free-flowing river densities were compared to breeding pair densities found on the impounded area (Thompson Falls to Noxon). The high and low density estimates were used to set a range for comparison:

River densities	1.10 - 3.36 pairs/mi
Reservoir densities	.83 - 1.83 pairs/mi
Difference	.27 - 1.53 pairs/mi

The difference between the two ranges was calculated and combined with the miles of river inundated for each reservoir to estimate the number of breeding pairs lost due to the reservoirs (Cabinet

Gorge 0.27 - 1.53 pairs/mi x 20 mi = 5-31 pairs; Noxon Rapids 0.27 - 1.53 pairs/mi x 38 mi = 10-58 pairs)

Criteria (b) and (c) on page 8 were considered during the development of the qualitative loss estimate. A ranking of moderate was assigned; although Canada goose nesting does occur on the reservoirs, it is probably to a lesser degree than if the river had remained free-flowing. Production was adversely affected by the loss of preferred nesting sites (islands) and brood rearing areas. The positive impact of increased stop-over areas partially offsets the adverse impacts to a degree; however, loss of productivity has a greater significance to populations.

O. OTHER WATERFOWL

1) Introduction

No breeding or migratory surveys of waterfowl were available prior to the construction of the two dams. Based on the known distribution and habitat preferences of waterfowl species in northwestern Montana, it was assumed a variety of waterfowl species inhabited the lower Clark Fork River and were affected by the formation of two reservoirs. Cavity nesting species such as wood duck, common merganser, common goldeneye and Barrow's goldeneye were probably present (J. Ball 1983, pers. commun.). Mallard, an upland nesting species was probably also found on the lower Clark Fork River. Several other dabbling and diving duck species may have occurred in the project areas during migration.

2) Seasonal Habitat Preference

The deciduous tree-shrub riparian, mixed conifer-deciduous forests, bottomland meadows, islands, and marsh-sloughs found in the project areas provided suitable nesting habitat for a variety of duck species. Cavity nesting species were likely to have utilized cottonwood and coniferous snags adjacent to the river. The mallard was probably the most common breeding waterfowl species and utilized bottomland meadows, riparian shrublands, and pond areas.

During migration, the open water of the river and adjacent ponds and sloughs were probably utilized for feeding and resting. Open water stretches were utilized by wintering waterfowl.

Recent fall-winter surveys reported the following waterfowl species on the reservoirs: mallard, American wigeon (*Anas americana*), common goldeneye, gadwall (*Anas strepera*), ring-necked duck (*Aythya collaris*), green-winged teal (*Anas crecca*) and bufflehead (*Bucephala albeola*) (Montana Dep. Fish, Wildl. and Parks, unpubl. files). No current breeding information was available.

3) Population Status

Population estimates were not available for the years prior to or immediately after construction of the two dams. It is assumed waterfowl densities were highest during spring and fall migrations, with lesser densities breeding and/or wintering along the Clark Fork River.

4) Assessment of Impacts

Breeding habitat for a variety of waterfowl species was inundated by the Cabinet Gorge and Noxon Rapids projects. Islands, riparian shrubland, bottomland meadows, and forests adjacent to the river provided suitable nesting sites. Bottomland meadows, sloughs, and ponds which provide escape cover and macroinvertebrate prey important to brood survival (Sugden 1973, Bellrose 1976) were inundated. These impacts may have been partially offset by the creation of islands and marsh areas as a result of the formation of the two reservoirs. An increased amount of open water areas is available as resting habitat for migrating waterfowl. However, the reservoirs probably do not support similar quantities of aquatic vegetation, a food source, due to fluctuating water levels, thus lowering the value of the reservoir to migratory waterfowl when compared to natural lakes.

Winter habitat for waterfowl was lost when primarily open water river habitat was replaced by two reservoirs which partially freeze over most winters.

5) Estimated Losses Due to the Projects

- Quantitative losses were estimated in terms of the net impacts to habitats utilized by waterfowl (Table 7).

- Qualitative loss estimate of moderate was assessed for the waterfowl species breeding in the lower Clark Fork River area, including mallard, wood duck, common merganser, common goldeneye, and Barrow's goldeneye.

6) Derivation of Loss/Gain Estimates

No regional or site-specific data were available to develop quantitative loss estimates based on breeding densities or other population parameters. It was agreed, during coordination meetings, the best approach would be to develop a table describing the impacts to waterfowl based on the loss or gain of particular habitats, the type and extent of their use, and the species involved (Table 7). Acreage estimates of the various habitats were based on Table 1.

Qualitative assessments were developed based on criteria (b), (c), and (d) on page 8. The qualitative loss estimate for mallard was rated as moderate (negative) based on the loss of nesting and brood-rearing sites (beaver ponds, riparian shrublands, and grasslands). The net increase in numbers and acreage of ponds may be overestimated as it was difficult to identify small ponds in the poor resolution aerial photos. It was assumed the inundated tributaries supported beaver ponds likely to have been utilized by mallards. In addition, a number of the ponds created by the reservoirs do not support aquatic or riparian vegetation and thus do not offer secure nesting or brood-rearing sites.

A qualitative loss estimate of moderate (negative) was assessed for the cavity nesting species (common merganser, common goldeneye, Barrow's goldeneye, and wood duck) based on the loss of preferred nesting and brood habitat. Although the habitats adjacent to the habitats contain suitable snags, these areas do not replace the preferred mosaic of habitats found adjacent to

Table 7. Estimated losses/gains of waterfowl habitat due to the construction of two hydroelectric projects - Cabinet Gorge and Noxon Rapids dams.

Habitat	Acres inundated	Acres gained	Net impact	Type of Use	Extent of Use	Species
Gravel bars	330	---	- 330 acres	Loafing sites	Moderate	Several species
Ponds	---[1]	109 (n-11)	+ 11 ponds	Brood areas; feeding and loafing sites	Moderate[2]	Mallard
Marsh-slough	20	167	+ 147 acres	Brood areas; feeding and loafing sites	Extensive	Mallard
Deciduous tree-shrub riparian	740	---	- 740 acres	Nesting and escape cover	Extensive	Cavity nesters
Grassland-hay meadows	1420	---	-1420 acres	Nesting	Smaller acreages adjacent to river used extensively; larger areas received reduced use	Mallards
Mixed conifer-deciduous forest	2650	---	-2650 acres	Nesting	Limited to areas adjacent to river	Cavity nesters
River	58 miles 2400 acres	---	Loss of riverine habitat	Resting; foraging; migratory stops	Moderate	Several species

Table 7. (Continued).

Habitat	Acres inundated	Acres gained	Net impact	Type of Use	Extent of Use	Species
Reservoir	---	11,100	Increased open	Resting; migratory stop	Moderate	Several species

[1] The presence of beaver ponds was not discernible on the pre-project aerial photos, thus the report of no acres of ponds inundated is probably incorrect.

[2] Several of the ponds created do not support riparian vegetation and may not be used by waterfowl.

the river, including the riparian forests and shrublands, the mixed conifer-deciduous forests, and the bottomland meadows.

P. PREVIOUS MITIGATION

Wildlife resource effects of the Noxon Rapids project were recognized as a concern and were mentioned in the project federal license along with fisheries issues (see Appendix F). However, to date no mitigation or compensation projects specifically for wildlife have been initiated at either reservoir. Members of the Noxon Rod and Gun Club placed 6 to 8 goose nesting structures on the islands near Noxon (Cabinet Gorge Reservoir) approximately 10 years ago. No recent monitoring of these nest structures has occurred.

V. SUMMARY

The Cabinet Gorge and Noxon Rapids dams collectively inundated approximately 8,700 acres of diverse wildlife habitat, including conifer forests, deciduous bottomlands, mixed conifer-deciduous forests and grassland-hay meadows. Additionally, islands, sloughs-marshes, and gravel bars were inundated. A river, several tributaries, and the adjacent mosaic of terrestrial habitats were replaced by two run-of-the river reservoirs. This loss of habitats adversely affected the diverse wildlife populations inhabiting the lower Clark Fork River area. Quantitative and qualitative loss estimates were determined for selected target species (Table 8) based on available pre- and post-construction population estimates and data from similar areas in northwestern Montana. Loss estimates were based on inundation of the habitat capable of supporting the target species. Whenever possible, loss estimate bounds were developed by determining ranges of impacts based on density estimates and/or acreage loss estimates. Net loss or gain estimates were reported when both negative and positive impacts were incurred.

Three species were determined to rate qualitative loss estimates of high based on the loss of important habitat and/or direct reduction in the resident population. Loss of important winter range capable of supporting white-tailed deer was identified, and loss estimates of 191-429 white-tailed deer and 463-1042 white-tailed deer were developed for the Cabinet Gorge dam and Noxon Rapids dam, respectively. Loss of preferred river habitat resulted in estimated loss of 6-12 river otters for Cabinet Gorge dam and 11-23 river otters for Noxon Rapids dam. It was assumed the inundation of yearlong habitat resulted in a total loss of resident ruffed grouse population. Based on density information, loss estimate ranges of 220-420 ruffed grouse (Cabinet Gorge) and 367-701 ruffed grouse (Noxon Rapids) were determined.

Eight species or species groups were assessed a qualitative loss estimate of moderate. Inundation of spring range had a detrimental effect on mule deer populations occupying the project areas. Approximately 320 acres of grassland-hay meadows were inundated by the Cabinet Gorge Reservoir; 1100-acres of grassland-hay meadows were inundated by the Noxon Rapids Reservoir. Inundation of spring forage areas and late summer-fall habitat had a detrimental effect on resident black bears, as well as bears occupying adjacent territories. Loss estimates included the loss of 223 acres and 1050 acres of spring forage areas for the Cabinet Gorge and Noxon Rapids projects, respectively. Approximately 330 acres (Cabinet Gorge) and 940 acres (Noxon Rapids) of late summer-fall habitat were also inundated. A negative impact was assessed for bobcats based on the loss of habitat capable of sustaining a prey base and the probable reduction in the resident bobcat population. This loss was not quantifiable; however, the bobcat losses will be addressed in the mitigation phase of this report. The reservoirs offer sub-optimal habitat for beavers and resulted in estimated losses of 6-13 colonies for Cabinet Gorge project and 11-24 colonies for Noxon Rapids

Table 8. Impact assessment for selected target species related to two hydroelectric projects on the lower Clark Fork River - Cabinet Gorge (CG) and Noxon Rapids (NR) dams.

Species/ species groups	Impacts	Qualitative estimate for both reservoirs	Quantitative estimate	
			CG	NR
White-tailed deer	Loss of winter range	High	191-429 deer	463-1042 deer
Mule deer	Loss of spring range	Moderate	320 acres	1100 acres
Elk	Loss of spring-winter range	Low	320 acres	1100 acres
Black bear/ Grizzly bear	Loss of spring and late summer-fall foraging areas; den sites	Moderate	223 acres (spring) 330 acres (late summer-fall)	1050 acres 940 acres
Mountain lion	Loss of prey base; disruption of territories	Moderate	191-429 (white-tailed deer)	463-1042
Bobcat	Loss of prey base	Moderate	---	---
River otter	Loss of denning and resting sites	High	6-12 otters	11-23 otters
Beaver	Loss of food resources, den sites and caches	Moderate	6-13 colonies	11-24 colonies
Bald eagle	Loss of winter habitat	Moderate	9-17 eagles	
Osprey	Increased numbers	Moderate (positive)	13 nest sites	
Ruffed grouse	Loss of yearlong habitat	High	220-420 grouse	367-701 grouse
Canada goose	Loss of nesting, loafing sites, and brood-rearing areas	Moderate	5-31 pairs	10-58 pairs

Table 8. (Continued).

Species/ species groups	Impacts	Qualitative estimate for both reservoirs	Quantitative estimate	
			CG	NR
Waterfowl				
Mallard	Loss of nesting sites and brood habitat for all species	Moderate	--	--
Common merganser		Moderate	--	--
Common goldeneye		Moderate	--	--
Barrow's goldeneye		Moderate	--	--
Wood duck		Moderate	--	--

project. As a result of the reservoir becoming ice-covered during winter, food resources (fish) are unavailable for wintering eagles. An estimated 9-17 bald eagles were lost due to the construction of both reservoirs. Inundation of preferred nesting and brood-rearing areas resulted in a detrimental impact to Canada goose production. Loss estimate ranges of 5-31 breeding pairs (Cabinet Gorge) and 10-58 breeding pairs (Noxon Rapids) were determined. Adverse impacts to other species of waterfowl, including mallard, wood duck, common merganser, common goldeneye, and Barrow's goldeneye were assessed due to inundation of nesting and brood habitat by both reservoirs.

Low qualitative loss estimates were assessed for two species. Spring and critical winter range for elk was inundated and had a negative impact on the small populations present at the time of construction of both projects. Approximately 320 acres (Cabinet Gorge) and 1100 acres (Noxon Rapids) of grassland-hay meadows were inundated. Loss of important spring (including slough-marshes and grassland-hay meadows) and late summer-fall (including upland shrub and deciduous tree-shrub habitats) foraging areas resulted in a negative impact on the small grizzly population. Approximately 223 acres of spring range and 330 acres of late summer-fall habitat were inundated by the Cabinet Gorge Reservoir. Approximately 1050 acres of spring range and 940 acres of late summer-fall habitat were inundated by the Noxon Rapids Reservoir.

One species, osprey, was assessed a qualitative estimate of moderate (positive). It was estimated an increase of 13 nest sites was attributable to the creation of two reservoirs.

No projects have been initiated to mitigate the negative impacts to wildlife due to the construction of the Cabinet Gorge and Noxon Rapids dams on the lower Clark Fork River.

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Appendix A. Cabinet National Forest estimates of big game animals, 1919-1939.[1]

Year	Deer	Elk	Black bear	Grizzly bear
1919	4,600	260	---	---
1920	4,550	310	---	---
1921	5,000	369	510	19
1922	4,800	244	590	24
1923	5,260	288	610	41
1924	6,550	233	745	56
1925	8,250	298	835	51
1926	9,000	328	870	46
1927	9,240	300	910	37
1928	9,550	290	840	49
1929	9,400	300	750	57
1930	9,400	340	750	42
1931	5,000	290	520	20
1932	4,700	450	600	25
1933	4,200	500	600	25
1934	4,000	525	575	20
1935	8,500	500	550	20
1936	10,300	600	590	20
1937	11,000	700	600	20
1938	10,700	620	650	20
1939	10,600	650	670	25

[1] Department of Agriculture, 1919-1939.

Appendix B. Population estimates of big game in the Clark Fork Management Unit (MDFG).[1]

Year	Mule deer	White-tailed deer	Elk	Black bear	Grizzly bear
1950-51	9,250	6,050	2,830	1,325	18
1951-52	9,450	7,350	3,015	900	25
1952-53	9,000	6,400	2,755	890	40
1954-55	12,180	11,300	4,170	825	20

[1] Couey, F. 1951, 1952, 1953, and 1955.

Appendix C. Population estimates of elk in the Thompson Falls Ranger District-Cabinet National Forest.[1]

Year	Estimate	Year	Estimate
1931	150	1946	500
1932	300	1947	400
1933	350	1948	400
1934	375	1949	1500
1935	400	1951	700
1936	525	1952	700
1937	525	1953	700
1943	500	1954	600
1944	600	1955	600
1945	650	1957	700

[1] U.S. Department of Agriculture, Forest Service, 1931-1957.

Appendix D. U.S. Forest Service estimates of elk populations on two ranger districts.[1]

Year	Estimate: Trout Creek	Estimate: Noxon
1951	75	
1952	150	
1953	150	60
1954	100	60
1955	100	90
1956	100	120
1957	300	---
1958	300	150
1959	500	150

2 Weckwerth 1959

Appendix E. U.S. Forest Service mid-winter bald eagle counts from surveys on the Clark Fork River.

Area	Year	Count	Source
Cabinet Gorge and Noxon Rapids reservoirs	1982	10	Kootenai National Forest - D. Henry 1984, pers. commun.
	1983	11	Kootenai National Forest - D. Henry 1984, pers. commun.
	1984	15	Kootenai National Forest - D. Henry 1984, pers. commun.
Paradise to Thompson Falls	1982	9	Lolo National Forest - G. Deibert 1984, pers. commun.
	1983	14	R. Krepps 1984, pers. commun.
	1984	5*	G. Deibert 1984, pers. commun.

* Poor survey conditions - ground fog.

Appendix F. Settlement agreement for the Noxon Rapids projects.

AGREEMENT AND RELEASE

This agreement made and entered into this 18th day of February, 1958, by and between THE WASHINGTON WATER POWER COMPANY, a Washington Corporation, First Party, and the STATE OF MONTANA, a body politic acting by and through the Montana State Fish and Game Commission, Second Party,

WITNESSETH:

WHEREAS, First Party is constructing the Noxon Rapids Hydroelectric Project located on the Clark Fork River in Sanders County, Montana, under license from the Federal Power Commission, Project Number 2075, hereinafter called "Project", and,

WHEREAS, Article 32 of said Federal Power Commission License, hereinafter called "License", requires the First Party to make and/or contribute to the making of pre-construction and post-construction investigations and studies of the fish and wildlife problems caused by construction of the Project and thereafter enter into negotiations and agreements with the State of Montana, Department of Fish and Game, for alleviating losses and costs created by the construction of the Project, and,

WHEREAS, the parties hereto have completed all pre-construction investigations and studies of fish and wildlife problems contemplated by Article 32 of First Party's license, and, the technicians representing both parties have collaborated on a study and work program designed to mitigate the claims of the party of the second part, and,

WHEREAS, Article 34 of the License requires the First Party to construct, maintain and operate such protective devices and comply with such reasonable modifications of project structures and operation of the

Project in the interest of fish and wildlife resources as may be prescribed hereafter by the Federal Power Commission upon the recommendations of the Secretary of the Interior and the State of Montana, Department of Fish and Game, and,

WHEREAS, Second Party claims that the construction of the Project in Montana will damage the fish and fishing in the State of Montana, and,

WHEREAS, First Party denies that any damage to the fish and fishing in said river will result from the construction of said project but, in order to settle any controversy as to legal liability, as well as to satisfy the requirements of the License set forth hereinabove, First Party has agreed to pay the hereinafter mentioned amount in full settlement of any claims for damage or damages to the fish or fishing caused by the construction of the Project, including any future damages which may hereafter develop by virtue thereof, and to satisfy the requirements of Article 32 and Article 34 of the License insofar as the State of Montana can so do,

NOW THEREFORE, in consideration of the sum of Seventy-eight Thousand Six Hundred Dollars ($78,600.00), lawful money of the United States of America, receipt of which is hereby acknowledged, the Second Party does hereby remise, release and forever discharge First Party, its successors and assigns, from any and all actions, claims and demands whatsoever which it now has or may hereafter have for or on account of any damage or damages to fish or fishing in the Clark Fork River in Montana and its tributaries by reason of the construction of the Project and the resulting storage of water in the Clark Fork River

Appendix F. (Cont.).

in Sanders County, Montana, including those consequences and damages which may hereafter develop as well as those which have already developed or are now apparent.

In further consideration of the said sum, the Second Party agrees to make all post-construction investigations and studies of the fish and wildlife problems caused by construction of the Project and hereby agrees that said sum shall constitute full payment for the alleviation of all losses and costs created by the construction of the Project.

In further consideration of the said sum, the Second Party agrees that it will recommend to the Federal Power Commission that no protective devices and no modifications of the Project structures and operation of the Project will be required as contemplated by Article 34 of the License, and agrees further that all conditions of said License have been fully complied with, insofar as they relate to fish and wildlife resources under the control, jurisdiction or supervision of Second Party.

IN WITNESS WHEREOF the parties hereto have executed this Agreement, by their officers thereunto duly authorized, this 18th day of February, 1958.

FISH AND GAME COMMISSION OF THE STATE OF MONTANA

By [signature]
Chairman

WASHINGTON WATER POWER COMPANY

By [signature]
Vice President

REQUESTS FOR FORMAL REVIEW - CABINET GORGE AND NOXON RAPIDS PROJECT

Mr. John Wood, Field Supervisor
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Ecological Services
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Billings, Montana 59101

Mr. Paul Brouha - no comments received
U. S. Forest Service
P. O. Box 7669
Missoula, Montana 59807

Forest Supervisor
Attention: Mr. Alan Christensen
Kootenai National Forest
P. O. Box AB
Libby, Montana 59923

Mr. Fred Shiosaki
Manager Environmental Affairs
Washington Water Power Company
East 1411 Mission Avenue
Spokane, Washington 99202

Mr. James Flynn, Director
Attention: Dr. Arnold Olsen
Montana Department of Fish, Wildlife and Parks
1420 East Sixth Avenue
Helena, Montana 59620

JUL 20 1984

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
Federal Building, Room 3035
316 North 26th Street
Billings, Montana 59101-1396

IN REPLY REFER TO:
ES

July 16, 1984

Mr. James R. Meyer
Department of Energy
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Mr. Meyer:

We have reviewed the document entitled "Wildlife Impact Assessment and Summary of Previous Mitigation Related to Hydroelectric Projects in Montana: Noxon and Cabinet Gorge Dams," prepared by the Montana Department of Fish, Wildlife, and Parks (MDFWP).

We have worked closely with MDFWP personnel during the preparation of this assessment, and we concur with its findings. We will continue to cooperate with MDFWP in preparing mitigation plans to compensate for the losses documented in their report.

Sincerely yours,

John G. Wood
Field Supervisor
Ecological Services

cc: Director, Montana Department of Fish, Wildlife, and Parks, Helena, MT
Field Supervisor, USFWS, Helena, MT (SE)
Regional Director, USFWS, Denver, CO (HR)

JUL 3 1 1984

United States Department of Agriculture
Forest Service
Kootenai NF
RR 3, Box 700
Libby, MT 59923

Reply to: 2610

Date: July 23, 1984

Department of Energy
Bonneville Power Administration - PJS
ATTN: Jim Meyer
P.O. Box 3621
Portland, OR 97208

Dear Mr. Meyer:

We have reviewed the final report titled "Wildlife Impact Assessment and Summary of Previous Mitigation Related to Hydroelectric Projects in Montana: Noxon and Cabinet Gorge Dams" by the Montana Department of Fish, Wildlife and Parks. As with the Libby Dam report, we had the opportunity to review and comment on draft versions and find the final report to be acceptable.

Sincerely,

for Larry H. Meshew
CHARLES F. BROOKS
Resource Staff

WWP 311S REV 8-73

THE WASHINGTON WATER POWER COMPANY

Electric and Natural Gas Service

P O BOX 3727 • SPOKANE, WASHINGTON 99220 • (509) 489-0500

RECEIVED
AUG 24 1984
WILDLIFE DIVISION

FRED A. SHIOSAKI
Manager
Environmental Affairs

August 22, 1984

Mr. James R. Meyer
Division of Fish and Wildlife
Bonneville Power Administration
P. O. Box 3621
Portland, OR 97208

Re: "Wildlife Impact Assessment and Summary of Previous Mitigation Related to Hydroelectric Projects in Montana: Noxon and Cabinet Gorge Dams"

Dear Mr. Meyer:

As per your letter of request dated July 2, 1984, my staff has reviewed the above-referenced document. This letter expresses The Washington Water Power Company's (WWP) comments concerning the report, subsequent to Mr. Woodworth's correspondence to you of July 25, 1984.

As you are aware, the Montana Department of Fish, Wildlife and Parks (MDFWP) has received input from WWP concerning this report since it was first commissioned by the Bonneville Power Administration. The comments provided by WWP staff have been advisory only and do not constitute an endorsement of the report or the interpretations and conclusions of MDFWP. The comments presented below represent WWP's general position in this matter.

The MDFWP report presents an assessment of possible wildlife impacts but does not include consideration of other consequences of the Cabinet Gorge and Noxon Rapids projects. The report results are therefore narrow in scope and do not address project effects within the context of serving the overall public interest. The projects and the effects of each must be viewed within this broader context to develop an accurate perspective of the projects' impacts. Deciding issues of public interest based on such perspective is the objective of the licensing and permitting processes which these projects have successfully completed.

Similarly, the significance of the impacts assessed has not been related to the present-day circumstances or status of wildlife. The impact to wildlife of inundating land may not be a substantial "cost" where wildlife populations remain healthy and/or recreational use opportunities are not appreciably affected. The results reported do not provide this important perspective, thereby further limiting the utility of the report.

Finally, the results presented in the document cannot be considered quantitatively or qualitatively actual because they stem from a largely hypothetical assessment. The method used is not an unreasonable approach to predict species-specific, point-in-time wildlife losses associated with land inundation, considering the limited and inexact information available. By necessity though, the loss assessments must rely on numerous assumptions and subjective interpretations. As such, the results are only illustrative of the types of wildlife-specific impacts which may have occurred within the inundation zone.

In conclusion, the results cannot be considered as absolute occurances due to the hypothetical nature of the analysis. Moreover, the analysis is narrowly focused and does not address the significance of impacts within the context of present resource status or tradeoffs with other values. Considering these concerns, the results are of limited utility and cannot be relied upon as justification for retro-active mitigation or as a basis for implementing enhancements for wildlife. The results may be most useful to MDFWP in planning the direction and emphasis of their future management efforts in the vicinity of these projects.

The above notwithstanding, WWP has met with MDFWP and other interested agencies to discuss present-day environmental concerns and means to further the environmental values of the Noxon Rapids and Cabinet Gorge projects, consistent with their licensed purpose. The Washington Water Power Company will continue to participate in such discussions with MDFWP and other interested agencies where efforts to improve and enhance fish and wildlife at these projects, if any, are mutual and focused to the future.

Sincerely,

Fred A. Shiosaki

Fred A. Shiosaki
Manager
Environmental Affairs

RDW:kmc

cc: A. Olsen (MDFWP) ✓

Montana Department of Fish, Wildlife & Parks

Helena, MT 59620
July 9, 1984

Mr. Jim Meyer
Bonneville Power Adm. - PJS
P.O. Box 3621
Portland, OR 97208

Dear Mr. Meyer:

This impact assessment, prepared by the Montana Department of Fish, Wildlife and Parks, is a thorough and concise analysis of the impacts to the wildlife and wildlife habitat resulting from the construction of the Noxon Rapids and Cabinet Gorge hydroelectric projects. This assessment is based on the best available site-specific information and pertinent literature and incorporated comments received from the operator, the Washington Water Power Company, and the various agencies involved in the management of the wildlife or wildlife habitat. The thorough review of th available information and the extensive coordination which as been completed has allowed for the development of a comprehensive assessment. This document represents Phase I of an ongoing process to achieve mitigation for the impacts to the wildlife resource resulting from the construction of the two hydroelectric projects. The impacts to the selected target species identified in this document represent realistic goals for mitigating the detrimental impacts to the wildlife resource.

Future cooperation between the operator, the Washington Water Power Company, and the various management agencies will guarantee that mitigation is completed and the projects are well conceived and long-term in extent.

Sincerely,

James W. Flynn

James W. Flynn
Director